MAR 17 1955

96th year

FEBRUARY 1955
Vol. 182—No. 2

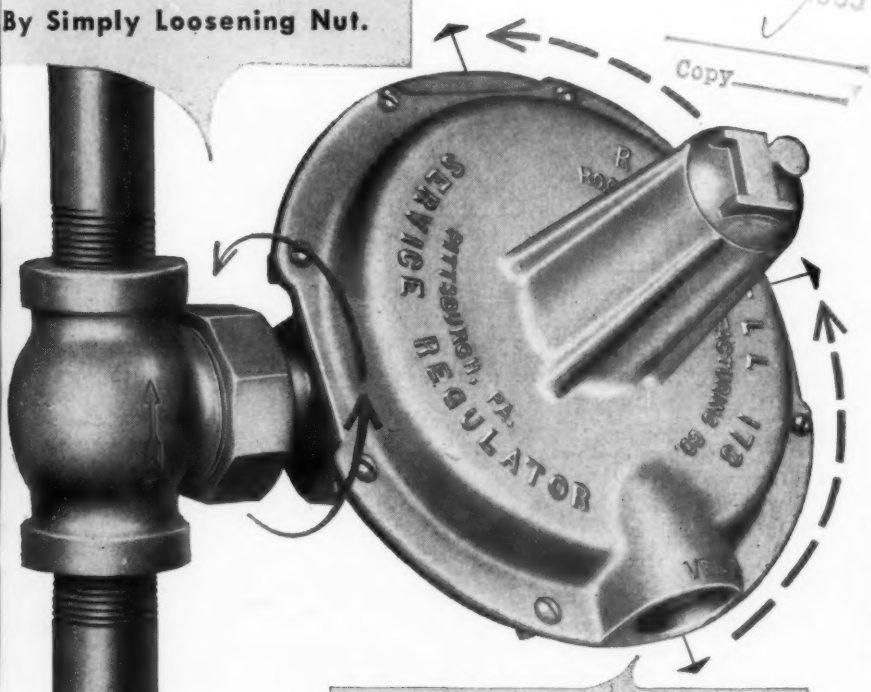
AMERICAN
Gas Journal

Per Order 16

THE ... CONG... SERIAL RE...
MAR 18 1955
Copy

In Any Location— Always Vents Downward

Diaphragm Case Swivels Full 360° To Any Angle With Pipe By Simply Loosening Nut.



Large Area Vent Turns To Three Positions On Cover Bolt Circle.

Rockwell "173" Service Regulator

This feature assures complete drainage and eliminates all possibility of clogging or freezing.

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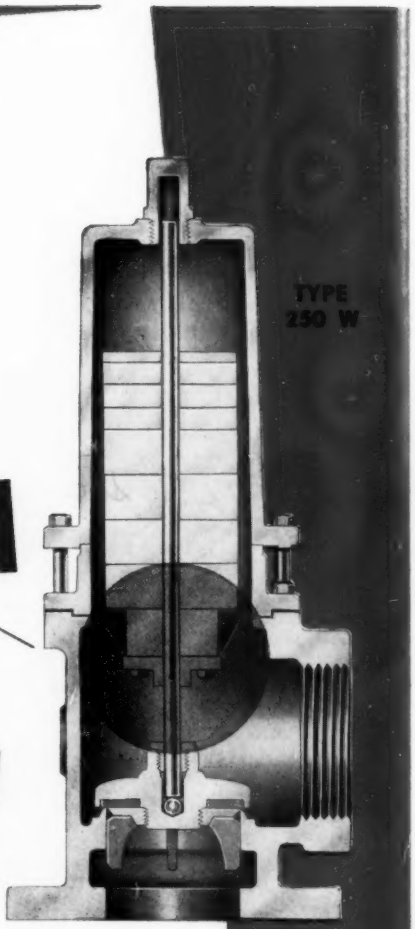
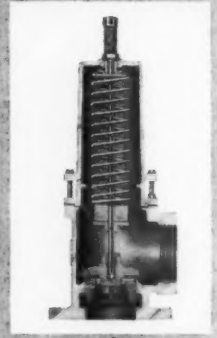
WHAT A DIFFERENCE A "D" MAKES in the NEW CHAPLIN-FULTON High Capacity *Safety Valves*





SPRING TYPE
250 S

WEIGHT AND
LEVER TYPE
250 WL

"D" stands for diaphragm, and what a difference it makes in the discharge ability of the new Chaplin-Fulton High Capacity Safety Valves—2½ times more flow capacity. After initial opening, the discharge pressure acting upward on the diaphragm insures maximum opening, and guarantees full flow with minimum increase in in the blowing pressure. This means greater protection for the users of Chaplin-Fulton Type 250 Safety Valves, adaptable in three models to all gas systems from ounces to 100 pounds. Sizes 2″ to 6″ inclusive.

Simple.... Foolproof

ACCURATE CF MFG CO DEPENDABLE

Chaplin-Fulton
MANUFACTURING COMPANY
Pittsburgh 25, Pennsylvania

SV-53-1

MAR 17 1955

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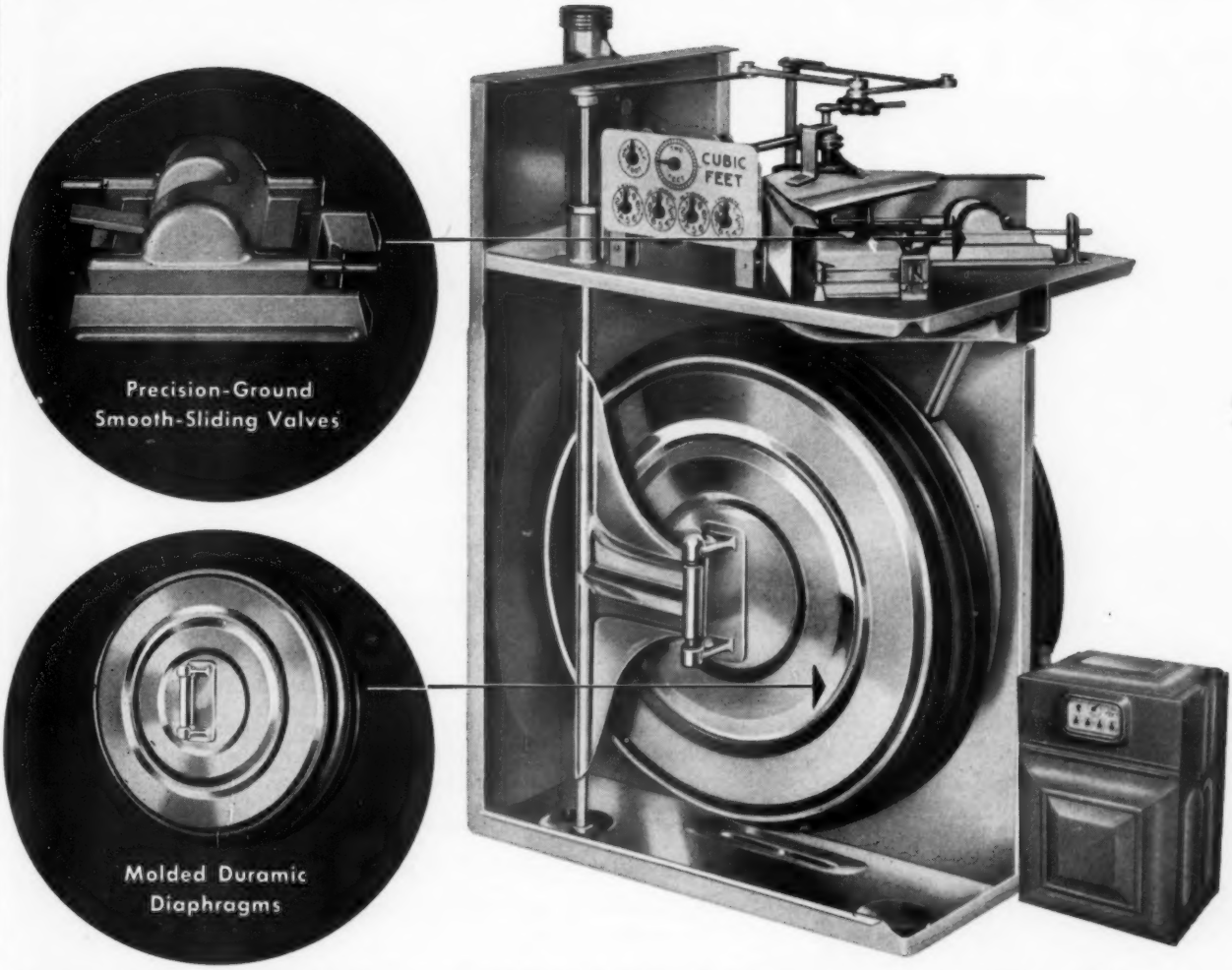

American has pioneered the greatest number of advances in measuring, regulating and testing equipment... leading — for nearly 120 years — in the design and production of the only *complete* line of equipment available to the Gas Industry.

The advances toward "sustained accuracy at lower cost" in Tinned Steelcase Meters shown here were developed after years of extensive research.

1. *Precision-ground smooth-sliding valves for even greater prolonged accuracy* and less friction than ever before... thanks to an exclusive method of grinding. Specially built automatic machines provide precision ground valve surfaces insuring gas-tight seals and constant high accuracy.

2. *Molded Duramic Diaphragms*, for installations requiring composition diaphragms, provide years of trouble-free, accurate service and minimum maintenance. American Duramic Diaphragms have been tested thoroughly in laboratory and field installations.

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Edmonton · Calgary

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1. **Flexible to permit low differentials.**
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10. **Economical in original cost and maintenance.**

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SYNTHETIC DIAPHRAGMS — FOR OVER 20 YEARS

AMERICAN
Gas Journal

VOLUME 182 | 96TH YEAR : : FEBRUARY 1955 | NUMBER 2

This month...

THE EDITOR acknowledges, with much appreciation, the invitation from the Public Utilities Buyers Group to present current-and-future views of the gas industry, at their recent spirited meeting in Houston.

TALK about safe driving is popular and plentiful but motorized killing-and-maiming moves upward at an unhealthy rate that shades the records of pre-A-bomb wars. Gas companies, generally, have been conscious of the costs, in dollars and public relations, involved in denting the public with cars, trucks and tractors. Seattle Gas Co. has proved the effectiveness of its approach to vehicle safety. Ingredients of the program include individual driver-pride and an attractive incentive. After reading Safety Director Willis' description of the plan and its effectiveness, we see strong possibilities for wide application throughout the industry. *Page 14.*

PAUL KAYSER, truly a gas industry statesman, has made invaluable contributions to a better understanding of the current controversy on Federal regulation of natural gas production and prices. The latest, before a group of editors, views gas as a commodity that is regulated effectively by the movements of supply-and-demand. *Page 19.*

ODORIZATION continues to receive important research attention and we are pleased to present Author Nevers' description of a new apparatus for odorant-evaluation. *Page 20.*

AMERICAN GAS FUNDAMENTALS has, most regrettably, fallen victim this month, to one of the uncertainties, unpredictables and uncontrollables that cause editors to sweat, cuss and awaken from nightmares with horrible screams. Certainly, this "continuing educational and refresher course in gas techniques, operations and management" will resume its place in future issues.

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Hilding H. Carlson · Editor

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Arthur Rohman · Western Editor **John F. Falvey · Financial Editor**

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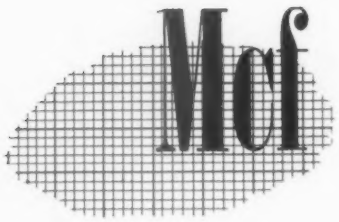

WASHINGTON observers of the FPC hearings on the principles that would be practicable in regulating natural gas production have made emphatic points of the "split" within the gas industry as evidenced by the testimony presented by utilities.

UTILITIES hit hard at escalator clauses. Counsel for New York's ConEd set out after all clauses such as escalator, favored nation, price-redetermination.

COUNSEL for FPC expressed view that so-called arm's length contracts, that producers want to continue, amount to ditching Federal regulation as it is now required. That expression is expected to carry weight with Commission.

CONSENSUS of producers: Only an amended Natural Gas Act will give them the type of relief they seek.

BUDGET submitted by The President includes $500,000 of added funds for administering producer-regulation.

COMPROMISE-form of amendment of Natural Gas Act, not granting *complete* producer-exemption, seems to be in the air. Some think it would have better chance of passage. We can't help observing that leaves room for all kinds of bill-riders.

COURT action by FPC relative to escape clauses—whereby producers can stop deliveries to pipelines to avoid coming under Federal jurisdiction—such action appears to be inevitable.

ADMINISTRATION not apt to take stand on the producer situation until, at least, Cabinet Committee on Energy Supplies and Resources has reported. Due soon. Watch for it in daily press.

DEMOCRATS in both House and Senate are at opposite poles on legislation relating to natural gas producers.

SEE Paul Kayser's viewpoints on natural gas production. *Page 19.*

KEFAUVER and his highly-publicized intention to investigate FPC (and the gas industry) seems to have been neutralized by the Senate. The man from Tennessee didn't quite get the nod for the chairmanship that was essential to get that investigation under way.

NELSON LEE SMITH, long-time, able and highly-respected member of FPC, has indicated he does not desire reappointment to the Commission. His departure from the bench is most unfortunate; his deep perceptions of the gas industry have been truly notable.

INSPECTIONS of gas appliances by the utilities, *on a free and monthly basis,* is requirement of bill in New York legislative hopper.

NEW plant-and-equipment expenditures of $24-billion annually will be required if the National economy is to provide employment for growing population and for maintenance of existing facilities efficiency—that is view of president of Investment Bankers Association.

ADVERTISING, a subject of interest to an industrial publication and to its readers, hit an all-time high in 1954—in terms of dollar-expenditures. All types of advertising in all media accounted for about $8,250-million last year, according to *Printers' Ink*. The forecast for 1955 is $8,750-million.

AGGRESSIVE and realistic attitude by advertisers was shown during business-lows of 1949 and 1954, when advertising efforts were increased.

AGE of automobiles rolling on the roads is changing, as shown in studies by R. L. Polk and Co. About 3 times as many cars are 1-to-3 years old as in 1947. Twice as many in 3-to-7 years bracket; about same number less than one year. From 7-to-14 years, there are big drops in numbers, but the real oldies, over 14 years, have increased.

BILL H.R.433, introduced by Hesselton (R., Mass.), would authorize FPC "to prescribe such requirements, restrictions, and conditions with respect to the construction, extension, operation, and maintenance of transportation facilities of natural-gas companies as, in its opinion, are necessary for the promotion of safety." Laudable as its ostensible purpose might be, this number can make trouble (that has nothing to do with safety).

GAS industry can and should, vigorously, support the code developed by gas industry safety code committee. Certainly, the industry's high level of safety consciousness has been established, and is on the record. This is an area where more legislation cannot carry the red tag, "In the Public Interest"—with any justification.

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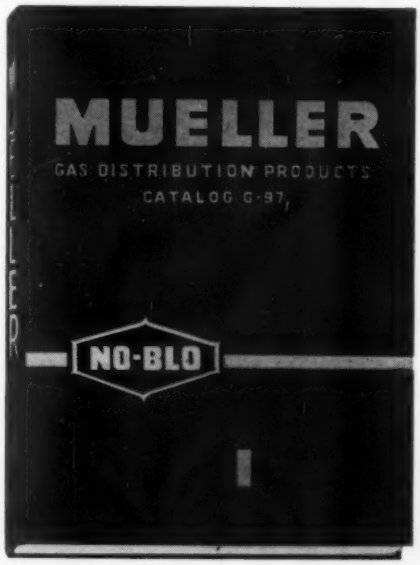
PLEASE DROP US A LINE!

We've just finished our new G-97 Gas Distribution Products Catalog and we want you to have your copy.

Initial distribution of this "all-new" Catalog is now complete and if you have not yet received your copy, please let us know-Mueller Co., Decatur, Illinois.



Catalog G-97 ... 20 sections ... 318 pages ... over 1100 illustrations and tables ... covering the complete line of Mueller gas distribution products ... plus useful engineering information.

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NO-BLO Method

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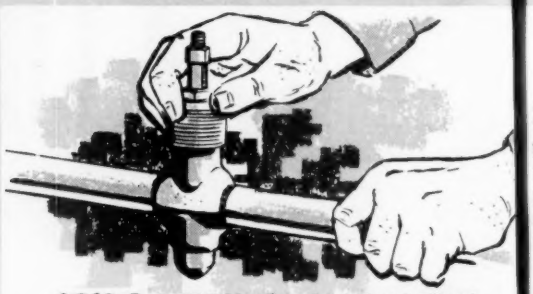
PROVIDES FOR FUTURE STOP-OFFS SAFELY...

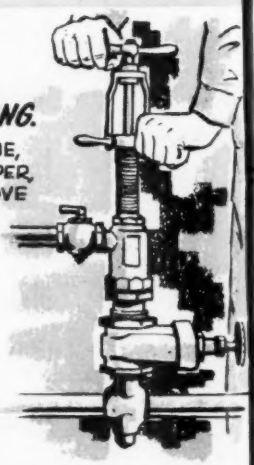
STEP 1. **SLIP FITTING ONTO LINE.**

LAY NEW LINE TO POINT WHERE A FUTURE STOP-OFF IS CONTEMPLATED. SLIP AN H-17150 EXTENSION STOPPER FITTING ONTO END OF PIPE SECTION AND WELD TO LINE.



STEP 3. **ATTACH EXTRACTING TOOL.**

REMOVE COMPLETION CAP, LOOSEN PLUG AND ATTACH EXTRACTING TOOL TO PLUG. MOUNT GATE VALVE AND STOPPING MACHINE ON FITTING, ADVANCE BAR AND UNSCREW PLUG. CLOSE VALVE AND REMOVE MACHINE.



STEP 5. **PLUG FITTING.**

PURGE AND EQUALIZE LINE, RELAX AND RAISE STOPPER, CLOSE VALVE AND REMOVE MACHINE. REMOVE STOPPER—ATTACH INSERTING TOOL AND COMPLETION PLUG AND REMOUNT MACHINE. OPEN VALVE AND SCREW PLUG INTO FITTING.

H-17152 for Lateral Extension Use

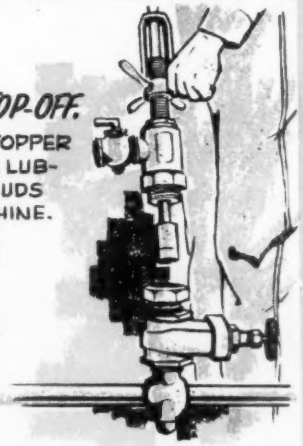
Used to connect a lateral ex tension to any size main unde pressur without th use of a gat valve. Also availabl with thread ed ends.

This is another of a series showing the broad applications of Mueller No-Blo Fittings and Machines.

STEP 2. COMPLETE LINE.

SLIP NEXT SECTION OF PIPE INTO FITTING AND WELD SECURELY. COMPLETE LINE AND PUT INTO SERVICE. ONLY ONE ADDITIONAL WELD IS REQUIRED! AT ANY FUTURE TIME, FITTING MAY BE UNCOVERED AND A STOP-OFF MADE AS SHOWN IN STEPS 3 THROUGH 6.

Stopper Fittings



STEP 4. MAKE STOP-OFF.

FASTEN RUBBER STOPPER TO INSERTING BAR, LUBRICATE WITH SOAPSUDS AND REMOUNT MACHINE. OPEN GATE VALVE, ADVANCE STOPPER AND EXPAND TO STOP-OFF LINE. ISOLATED SECTION MAY NOW BE REPAIRED.

STEP 6. CAP FITTING.

REMOVE STOPPING MACHINE AND GATE VALVE, TIGHTEN COMPLETION PLUG WITH WRENCH AND SCREW ON COMPLETION CAP FOR DOUBLE SEAL. OPERATION IS NOW COMPLETE, BUT MAY BE REPEATED AT ANY TIME.

H-17151 for Dead End Extension Use

Used to cap new lines and automatically provide a simple maintenance free means for extending the line in the future. Stop-off is made, cap is cut off and extension is welded in place.

Mueller H-17150 Extension Stopper Fittings are one-piece forged steel line stopper fittings specifically designed for new construction—providing a simple means for future stop-offs without installing an expensive valve requiring continual maintenance.

No drilling is necessary to make a stop-off and the absence of sharp pipe edges prolongs stopper life. Stop-offs may be made under pressure at any time with a Mueller Stopping Machine.

The heavy forged steel body is recessed for quick, easy alignment of pipe ends—only one additional weld necessary to install fitting in line.

Working pressures to 250 p.s.i. at 100° F. Sizes 1½" and 2" shown.

For additional information on No-Blo Extension Stopper Fittings, consult your Mueller Representative or write direct.

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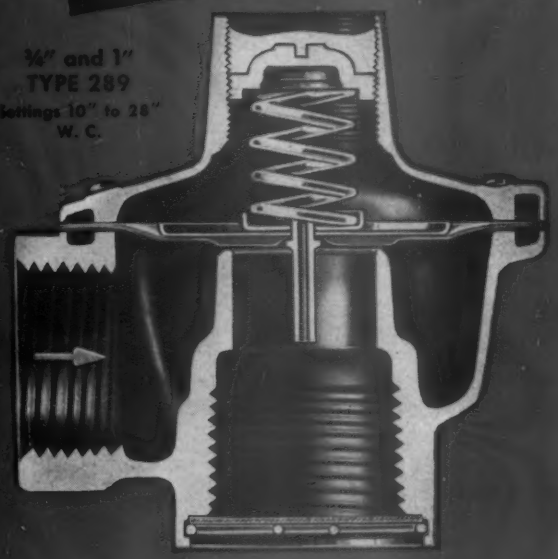
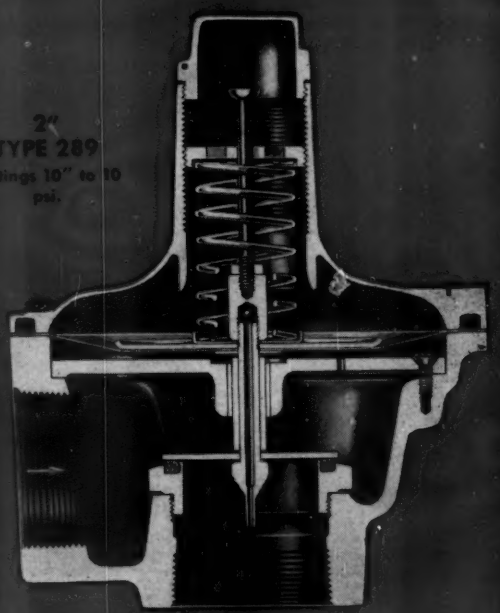


2"
TYPE 289
Settings 10" to 10 psi.



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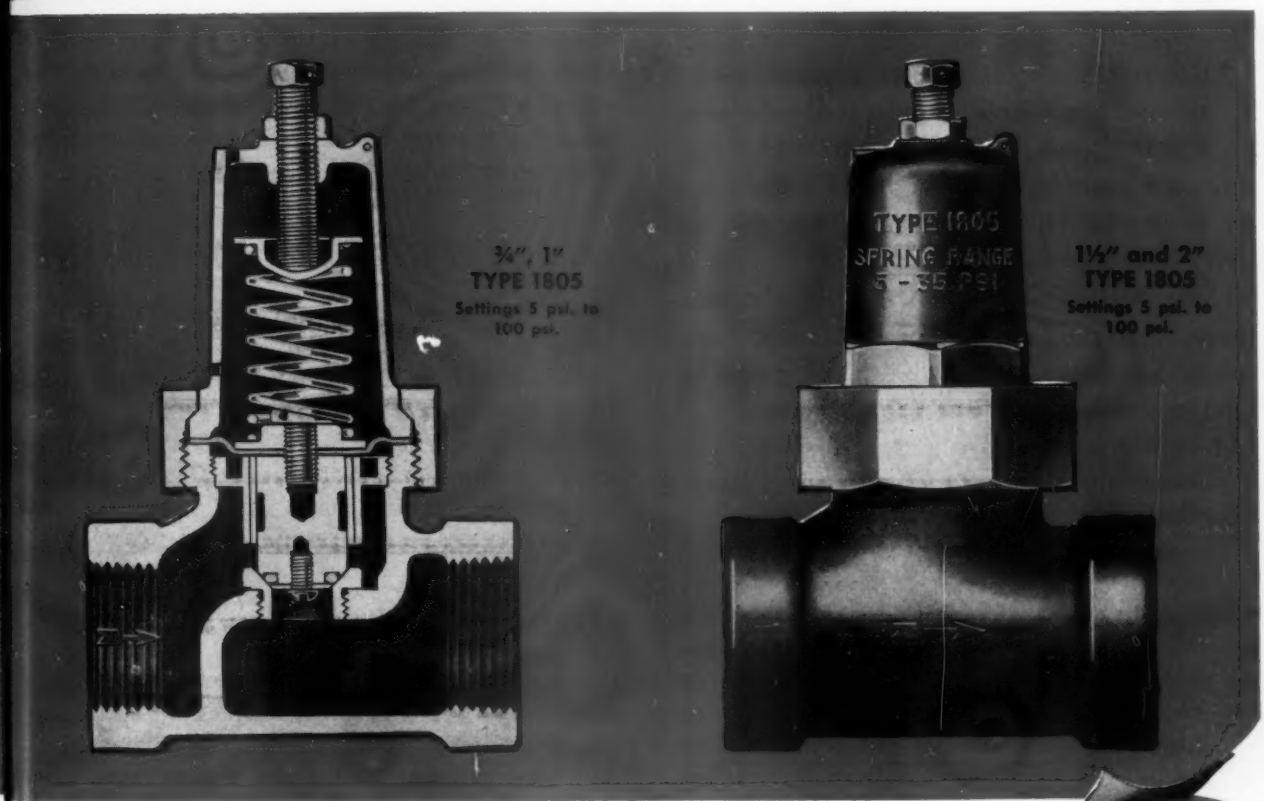

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Our 75th ANNIVERSARY

BETTER GAS PRESSURE CONTROL

Natural gas producers, small and large, are convinced that if the American people understand the issues regarding federal regulation they will reach the right decision. Therefore, we are endeavoring to lay the subject before the people and to encourage the fullest possible discussion of the issues. To do so, this advertisement has been placed in newspapers throughout the country.

What the Regulation of Gas Supply Means to 25,000,000 American Families

THE FIVE THOUSAND producers of natural gas—large and small—believe that the free competitive system which has increased your gas supplies and kept rates low is the best for consumers, for the industry, and the economy.

They believe the proposal to abandon competition and clamp bureaucratic controls on gas production will hurt consumers, damage the industry, and *benefit no one*.

Here are some answers to questions you as a consumer may have on this vital issue.

What Is This Regulation?

Sixteen years after a 1938 law was passed, a new interpretation of some of its words now forces the Federal Power Commission to do what it has eleven times refused to do—try to fix the price that an interstate pipeline pays the 5000 competing producers who find the gas and get it from the ground.

Will This Regulation Reduce Our Gas Bills?

Hardly. Only about 10% of the average gas bill goes to the producer who finds the gas and sells it. The other 90% pays for constructing, maintaining and operating the long-distance pipelines and local distribution systems—already regulated.

How Will Regulation Affect Supply?

It will reduce the supply. Most natural gas is produced by "wildcatters" and other independents. They are used to keen competition and big risks. But put them under Federal controls—with permits, endless forms, licenses, hearings and suits—and the work of exploration is sure to suffer. Three new pipeline projects to bring gas to more consumers have been suspended since regulation took effect.

Hasn't Gas Always Been Regulated?

Gas *distribution*, yes. It makes sense to have only one pipeline bring gas to a community—and one gas company distribute it in the community. Both do a good, efficient job for you, and as monopolies they are naturally regulated.

But there's no monopoly in *finding* gas. Far from it. Gas *production* is risky and keenly competitive. There are five thousand large and small producers looking for gas—and finding it in only one out of

every nine exploratory wells they drill. They compete vigorously to sell their gas. A single pipeline may buy from 200 or more producers.

Is Gas Different from Coal or Oil —or Grain?

It isn't. And if there's price-fixing for natural gas at the well so can there be next for coal at the mine or oil at the well—or lumber in the forest, or grain on the farm.

How Did The Consumer Fare Before This Regulation?

Here's the record. In the past 16 years natural gas production has increased 200% and the price the consumer paid for gas has risen only 1/11th as much as the general cost of living.

Do Only A Few Big Companies Produce Gas?

No. The largest 37 companies produce less than half the nation's gas. No single company produces more than 5%. The small producers do more exploratory drilling than do all the big companies combined. And none of the producers has any monopoly, any exclusive franchise, or any protection.

What Is The Natural Gas and Oil Resources Committee?

It is made up of companies and individuals concerned with natural gas. It includes a great many large and small gas and oil producers. All believe there is no more reason for OPA-like price-fixing on gas than on steel, coal, autos, meat, or shoes, which could be next. All believe that free competition is better for all of us than a price-controlled economy, which has historically led to stagnation, scarcity and rationing.

What Can I Do?

You can reason out the issues, reach your own conclusions, and make those conclusions known to your friends and neighbors.

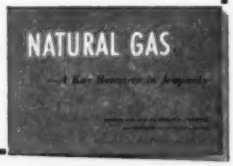
Under free competition without federal regulation—

- Natural gas became plentiful—output rose two hundred per cent in the past sixteen years.
- Natural gas stayed reasonable—and gas prices to the consumer rose only one-eleventh as much as living costs in the past sixteen years.
- Natural gas has helped create thousands of jobs in industry and now supplies one-fourth of the nation's energy resources.

NOW.....cumbersome federal controls threaten all this progress.

FOR MORE FACTS WRITE FOR THIS BOOKLET NOW!

You have the right to know the facts about this new government regulation—a peacetime control of free, competitive producers. Send today for the booklet, "Natural Gas—A Key Resource in Jeopardy."



NATURAL GAS AND OIL RESOURCES COMMITTEE

Room 5402, 350 Fifth Avenue, New York 1, N. Y.

When was the last time you took a good, close look at your communications?

To keep in step with your constantly changing business, your communication system should be examined periodically. In that way, your communications never become outdated—always meet your exact needs at the lowest cost. If you have Bell System service, such studies are a continuing activity.

Bell System communication engineers will also help you take a good, close look at your own communications . . . *at no cost to you!* Their detailed study will help you get the most efficient use of your facilities . . . whether they are long distance, mobile, teletypewriter, or metering and supervisory control.

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METERING CHANNELS

BELL TELEPHONE SYSTEM

Editorial:

Are We Really Going Back to Manufactured Gas?

LET'S take a brief look at one current economic consideration associated with utility distribution of natural gas—one that has serious implications for the early-future.

At least New England is finding itself at or near the point where the utilities can return to the manufacture of gas with a showing of economic justification for such a move. Studies have been made in that direction.

If, through rising natural gas prices from the pipelines to the utilities, that situation is aggravated, the studies will have more-and-more validity. That is to say, they will become more-and-more attractive.

Would it not become a matter of necessity, created by the forces of competition, for the utilities to reduce their takes of pipeline gas—eventually to the contract minimums—in the interest of reducing their own average costs? And, if pipeline gas prices continued in the upward trend, with ever-sharpening competitive disadvantages, would there not be a possibility of justifiable contract breaches?

The situation may be most emphatic in New England, today, but that is because New England is at the end-of-the-line. Certainly, it is reasonable to expect that such a situation would move, progressively, back toward the producing area—if there is no forthright recognition and alleviation.

If this manufactured-gas-again movement takes hold to the point where it is a working fact, with increasing magnitude, the utilities will be hit for capital expenditures; the pipelines will get it in the neck with declining load factors in the areas involved; and, of course, the producers will sell less pipeline gas.

We know the utilities in New England are concerned. We can only assume that the pipelines are not disregarding the situation. We do not pretend to know the producer-viewpoint.

But—we'll bet that some insurance companies and other big-dough lending institutions are thinking about it.

Gas Industry's No. 1 Girl

WE like to believe that we do not need to give way to anyone in the entire gas industry when it comes to continually boosting the Mrs. America contest. Here, the industry has a promotion that can be taken to any height with entirely reasonable expectations of commensurate effectiveness and return.

This year's contest, interim reports indicate, has a wider and much more active gas company support than in 1954—and, certainly, 1953. For that, the participating companies deserve compliments that are no less enthusiastic than the caustic criticism that was included on this page in a review of the low reaction to the 1954 contest.

For the gas industry—for the individual gas companies and for the appliance manufacturers—we are downright delighted that there now is a strong determination to garner all possible values from publicity-public relations-press agentry-promotion associated with the contest. No matter whether the plugs are National, statewide or local, their values accrue to the benefits of the local gas utilities.

Some gas companies established those values, last year, at high levels. Now, it is clear that substantially more companies are going to test the contention that Mrs. A. is one of the most effective promotions that gas industry has had.

This seems a good time to urge review and as-indicated revisions of local contest operations, so that no available and applicable gimmick is omitted.

To those gas companies that have not picked up Mrs. A. as their 1955 promotional heart-throb: It's not too late. You can—*if you act promptly*—get fully-spirited and emergency cooperation from American Gas Association.

That brings to mind that AGA's S. F. Wickstrom, through his convincing application to this promotion, has made invaluable contributions to moving it ahead this year. Of course, much more—even this year—could have been accomplished if the AGA budget for Mrs. A. did not have the hot-and-damp dime aspects which are too-evident.

Ever hopeful, we look toward the possibility of some crisp folding money for the 1956 budget.

Seattle Gas Co. Gets Payoff in Vehicle Safety Program

by **Avery W. Willis, Jr.**
Safety Director
Seattle Gas Company

THE new fleet safety program of Seattle Gas Co. went into effect in 1946. Although we had had a fleet safety program for a number of years, previously, the conviction had grown that it was neither strict enough nor as closely supervised as it should be. The results achieved over the last 8 years have proven that a well-planned, tightly-organized program will repay several times over the cost and effort that goes into it.

Here are the major advantages derived from our new truck fleet safety program:

1. The number of accidents has been gradually reduced to about half as many as we had in 1946. This has meant a corresponding reduction in property damage and in the potential risk of injury and death.
2. The savings in insurance costs alone have paid for the program.
3. We have been able to keep all our vehicles in operation for a greater part of the year. When a vehicle is laid up due to accident or other causes, we know we are losing money. To keep our work serviced properly it is necessary to either double up the load on one of our vehicles or hire a replacement. The cost through loss of the damaged vehicle may be greater than the repair bill.
4. The program has been the instrument for improvement of management-employee relations. Safety is a non-controversial objective which everyone endorses, yet genuine effort is required to obtain good results. By working with our employees on a program that enlists their unqualified support, we believe we have encouraged better efforts from them in other work activities.
5. We have improved our public relations by making our drivers more courteous and careful.

The program covers all drivers of our fleet of 102 vehicles. These include 22 passenger cars, the rest being trucks from ½ ton panel to 1½ ton units. We service over 1,100 miles of gas mains in Greater Seattle.

Our fleet covered 893,734 miles last year. The average mileage per vehicle is comparatively low, but it is all city driving, which is more accident-productive than country driving.

Our best driving record to date was made in 1954. Last year we had 18 accidents, of which 6 were non-preventable. Our worst year, since the new program began, was 1949, when we had 38 accidents, of which 14 were non-preventable.

Last year, too, we had our first 100-consecutive-days period without accident. This goal has been approximated several times but has never previously been achieved. Free vacation awards for that accomplishment were made with suitable ceremony.

Since carelessness can so easily creep into the driving habits of an individual, constant vigilance is the price of an effective safety program. In setting up our program, therefore, we approached the problem from a number of different angles so that our drivers would be constantly reminded of the necessity for safe driving and would want to establish good personal driving records. The 10 points which we follow give us about as effective a program as we could expect to develop:

1. Membership in the National Safety Council;
2. Setting up a safety committee in accordance with recommendations of the Council;
3. Setting up standards of performance in driving;
4. Establishment of investigative procedures and classifications of accidents;
5. Physical, driving and written examinations of drivers;
6. Safe driving awards;
7. Contest for safe driving;
8. Public tabulation of personal driving records;
9. Frequent safety meetings;
10. Regular fleet maintenance.

Joining the National Safety Council has been of great benefit to us; our entire program is set up along general lines recommended by them. They have also furnished effective literature and posters that we could not very well have supplied ourselves.

Our fleet safety committee is actually a subcommittee of the general safety committee which covers also industrial safety. This subcommittee consists of 6 voting members, of whom 4 are driver-employees and 2 are management representatives. The safety director is the seventh member, but does not have a vote. Consequently, the representatives of the employees are in position to out-vote the representatives of management. In practice, however, it does not work out in any such division. The employee representatives are just as severe in judging a driver involved in an accident, as are the others. This is just one reason for the conviction that the program has served the objective of better employee relations. The employee representatives on the committee are elected by the drivers themselves, and serve for periods of only 6 months, as recommended by the National Safety Council.

Vernon Damm, distribution superintendent, Seattle Gas Co. (left), discusses new material from National Safety Council with Avery Willis, safety director and author of this article.

Driving standards set

The main function of the fleet safety committee is to set standards of safe driving and to fix the responsibility where accidents have taken place.

In every accident, the driver is required to make a detailed report, which is checked by the committee. He must then appear before the committee and the accident is re-enacted graphically on a chart, using small plastic cars to simulate the vehicles involved. If the driver is considered to be at fault, he is charged with a "preventable" accident. If there was nothing he could have done to avoid it, it is classified as "non-preventable."

The very existence of the committee acts as a powerful deterrent to careless driving. The driver not only knows that such an accident will be entered on his record, but

AMERICAN Gas Journal FEATURE

After 100 days of accident-free driving by operators of Seattle Gas Co. vehicles, a drawing determined the 2 drivers who were to win the week's vacation-with-pay. Here, L-to-R, after the drawing, are: Barbara Fairchild, the name-picker; winner Charles King; Mr. Willis; winner Sone Nelson; Mr. Damm.

Results measured . . . 100 days without accident is objective

he knows that he will have to appear before the committee and be questioned. Most drivers do not relish that prospect.

Our standards in judging accidents are purposely severe. We train our drivers to practice "defensive" driving, which means that it is up to them to do everything possible to avoid an accident regardless of the degree of fault of the other driver. A driver who may be completely cleared of any blame by the police department may very likely be charged with an accident by our committee. If there was anything that he could have done but did not do, to avoid the accident, he is charged with a preventable accident. And, as far as we are concerned, there is no such thing as the right-of-way at an intersection.

Accidents are classified according to conditions and factors causing them, such as speed of vehicle, accidents occurring while backing. This enables us to pin-point specific driving weaknesses and to educate employees accordingly.

Examinations and tests

Besides the general physical examination that any new employee must take, we require employees who will drive to take a special physical, testing for specific defects which could affect their driving. Old employees have also been tested under the new program.

Close-up of the board on which Seattle Gas Co. maintains individual drivers' safety records.

If defects are found, they do not result in a man being rejected. In many cases, if he knows what his defect is he can make allowance for it in driving. Defective depth perception, for example, is not dangerous if the driver knows it is defective and drives accordingly. In one case, a driver who had been involved in several accidents causing damage to his right rear fender, was found to have defective lateral perception. He was told about it, and learned to allow for it in driving. He has not had an accident since that time. Examinations frequently reveal physical defects, especially in eyesight, that the individual did not know that he had.

We also give each man a driver's test, sending him to a private driving school in the vehicle which he will operate. They are seldom found to be deficient in driving skill, we've discovered. Driving habits and judgment are the most crucial points. They are also given a detailed written examination designed to find out how well they know the laws and rules of safe and courteous driving. Altogether, the tests take at least 2 hours and usually longer.

Incentives in Seattle's program

Positive incentives for safe driving must be provided by any well-rounded program. Two impelling incentives are provided in our program, by our safe driving awards, and our "100-day-contest."

A National Safety Council award in the form of a pin with a shield emblem is given to every driver who completes a year or more of driving without a chargeable accident against his record. Drivers are penalized an extra year whenever they have a chargeable accident. In this case, they must drive one more year without a chargeable accident before they start to accumulate time that counts toward another year's award. Accordingly, they must have 2 accident-free years to win one year's award, following the year in which they had their accident.

Awards are given at an annual banquet, with suitable ceremony and public recognition. Some of our drivers now have 8-year pins.

Our "contest" consists of a standing offer of a week's vacation with pay to 2 members of our crew of drivers. When all members of the fleet safety contest complete 100 days without a preventable accident a drawing is held with the 2 winners receiving the vacation. There have been several times when the goal was almost reached, but last year was the first time in 8 years that this was achieved.

Names of all drivers were placed in a bowl, and the winners' names picked out of the bowl as the high point of a special ceremony. Resulting publicity includes articles and photos in the daily newspapers.

The safe-driving performance of all employees is tabulated publicly in the dispatching room at our distribution department. There, we mounted an unusual board that consists of metal molding strips mounted horizontally. The name of each driver is inserted with tabs next to his name to indicate his driving record. A tab with a shield similar to a safe driving pin indicates one year of accident-free driving. Another type of tab indicates an accident, with the date of accident also recorded. For non-preventable accidents the tab is blue; for chargeable accidents it is red. The board shows graphically the safe-driving status of the employees, and provides another positive incentive for effort.

Progress made toward the 100-day goal is recorded on an outside blackboard in the yard. Our industrial safety progress is also recorded here, on an adjoining board. Virtually every driver on the crew sees the boards, and watches the crews' progress daily.

Once-a-week safety meetings are the rule for all personnel of Seattle Gas Co. Industrial safety is discussed here too, but truck fleet safety gets its full share of attention. Duration of these meetings is only 15 minutes, and 3 separate meetings must be held, taking one-third of the employee force at each meeting. We consider it much more effective to hold short, attention-getting meetings at frequent intervals like this, than to hold longer ones less frequently.

Since maintenance of vehicles is important to safety, for this and other reasons we have installed a first-rate preventive maintenance program. Drivers are given responsibility of seeing that their vehicles are given proper service when they need it, and that mechanical parts specifically affecting safety are in first-rate repair at all times.

Our program has paid in dollars and cents—it has paid in employee-relations—it has paid in public relations—because we have kept our guard up.

California Gas Companies Built and Operate Pipeline to Assure Supply

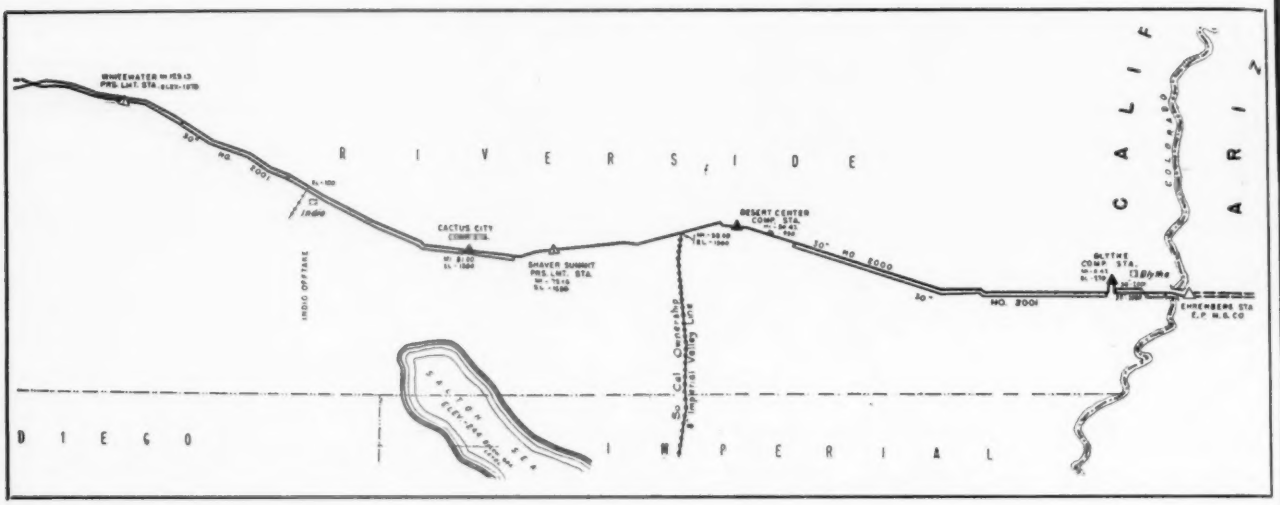


Figure 1. Map showing portion of the pipeline system built and operated jointly by Southern California Gas Co. and Southern Counties Gas Co. The Blythe station, near the California-Arizona state line, Desert Center and Cactus City stations, discussed in this article, are included in this map.

SOUTHERN California Gas Co. and Southern Counties Gas Co. initiated plans that resulted in the first delivery, November 1947, of gas from Texas and New Mexico to customers in California. The transmission facilities have been built and operated by the 2 companies.

The natural gas carried by this utilities-operated pipeline is delivered to it by El Paso Natural Gas Co. at the California-Arizona state line.

Eventually, the gas reaches the major distribution centers in the Los Angeles metropolitan area, the Imperial and Coachella valleys, and the San Diego area.

Step-by-step increases were made in the rates at which out-of-state gas was purchased, to keep pace with the continued rapid growth of Southern California. A compressor station with seven 1,600-hp reciprocating gas engine compressor units was put in operation in 1948. This station raised the operating pressure near Blythe to 807 psi, maximum design pressure of the pipeline, and normal capacity of the line was increased to 305 MMcf per day. By fall, 1950, with completion of a 30" loop line, 83 miles in length, from Whitewater station to Puente station and increasing size of the Blythe plant to 10 units with an aggregate total horsepower of 16,480, the nominal system capacity became 410 MMcf per day.

In 1952, arrangements were completed for the purchase of an additional 151 MMcf daily of out-of-state gas.

Based upon the forecasted growth of requirements and anticipated decreasing supply from California gas sources, still another increment of out-of-state gas of 151 MMcf daily was contracted for. The facilities necessary to increase the capacity of the California system to 713 MMcf daily are nearing completion.

All pipeline work of both additions has been completed. During a test of the system, a flow rate of 745 MMcf per day was reached.

The location of the pipeline, the compressor stations major terminals and connecting pipelines are shown in Figure 1. The Desert Center booster is 43.5 miles from the Blythe compressor station, and the Cactus City plant is 31.1 miles downstream from the Desert Center unit.

Factors in choice of gas turbines

Several factors influenced the selection of combustion gas turbine driven centrifugal compressors as elements in the facilities necessary to increase nominal line capacity from 410-to-561 MMcf daily. Original 1950 plans for the facilities necessary for this increment in capacity included a total of 78 miles of loop line. Due to the shortage of steel, sufficient pipe for such a program could not be obtained. Alternates of 1, 2 or 3 intermediate booster compressor stations were weighed. It appeared that a system including 2 gas turbine driven centrifugal compressors was suited for this application.

When compared with reciprocating compressors for the low compression ratio required, the anticipated lower capital investment and lower labor costs appeared to more than offset estimated differences in fuel economy and result in lower total annual costs if the gas turbine driven centrifugal gas compressor were to be used.

Facilities at turbine stations

The main unit at each of the stations is composed of two major components, the prime mover and the compressor. The main unit is shown in Figure 2. The prime mover is a natural gas fired 5,700-hp regenerative cycle, 2 shaft, General Electric combustion gas turbine. The original rating of 5,000-hp has been raised by the manufacturer to 5,700-hp, based upon operating experience. This prime mover is made up of an axial flow air compressor having 14 stages, a combustion system composed of 6 combustion chambers mounted concentrically around the high pressure turbine frame, a high pressure turbine wheel on the same shaft as the air compressor, and a low pressure turbine on a separate load shaft. The shaft of the centrifugal compressor is coupled directly to the load shaft of the prime mover. The normal speed of operation of the air compressor shaft is 6,900 rpm, and that of the load shaft, which drives the centrifugal gas compressor, is 5,000 rpm.

The compressor at each station is a De-Laval single stage centrifugal. Compressor is shown in Figure 3. The maximum design operating discharge pressure of the compressor at Desert Center is 807 psig and that at Cactus City is 725 psig. There has been no provision made to date for cooling of the gas discharged from either of the 2 stations.

At each station, the main unit, together with the small auxiliary and control equipment, is housed in a structural steel frame Transite covered building.

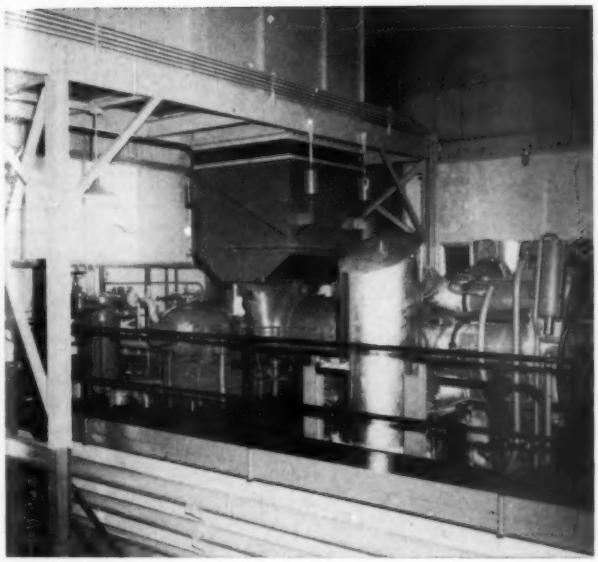


Figure 2, *above, left.* Main unit, showing the 14-stage axial flow air compressor.

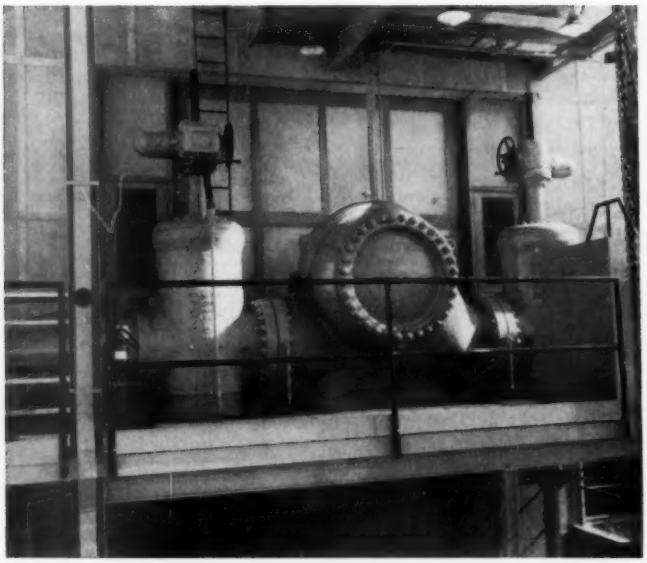


Figure 3, *above, right.* This view of the gas compressor shows the motor-operated suction valves.

Southern California-Southern Counties using gas turbines on 705MMcf line

The flows of combustion air, fuel, and combustion products through the prime mover and regenerator, with representative values of temperature, pressure, and quantity are shown in Figure 5. Conditions illustrated are for 5,700-hp output to the gas compressor; load shaft at 5,000 rpm.

The automatically-controlled starting and stopping sequences include a number of operations. The station is placed in service as the operator switches on the dc power from the station battery. He then checks the levels in the lubricating-seal oil and turbine cooling water tanks.

Control switches for the motor-operated gas valves are then placed in the automatic start position and the equipment is ready for the automatic starting sequence.

If the gas engine auxiliary ac generator is operating, the operator can start the ac cooling water pumps, nozzle cooling water pump, and the fin-fan units that will be switched to the direct driven main generator when the main unit reaches operating speed.

The operator then pushes the start switch. The dc auxiliary lubricating oil pump and dc nozzle cooling water pump will start and build up the required lubricating oil and water pressures.

The pressure switches in the system close and the unit starts. The starting turbine brings the high pressure air compressor shaft up to 1,100 rpm and holds it there for 7½ minutes.

Gas expanded from transmission line to atmospheric pressure through the starting turbine provides the necessary power. During this period, the combustion system is purged with air from the axial flow air compressor, and the gas compressor is purged, pressurized, and compressor suction and discharge valves opened.

The combustion turbine fires and accelerates to the high pressure turbine speed of 4,500 rpm, at which time the load shaft breaks away and accelerates to 2,600 rpm, and the unit is ready to load.

At this stage, the direct driven electric generator is out on the line, and the auxiliary unit is shut down. The main line gas valves are first closed, then the station bypass valve is closed. The gas compressor shaft speed is brought to desired value.

The speed of the high pressure shaft is then controlled to provide the gas compressor horsepower requirement as determined by the amount of gas being compressed. The operating control is on the ex-

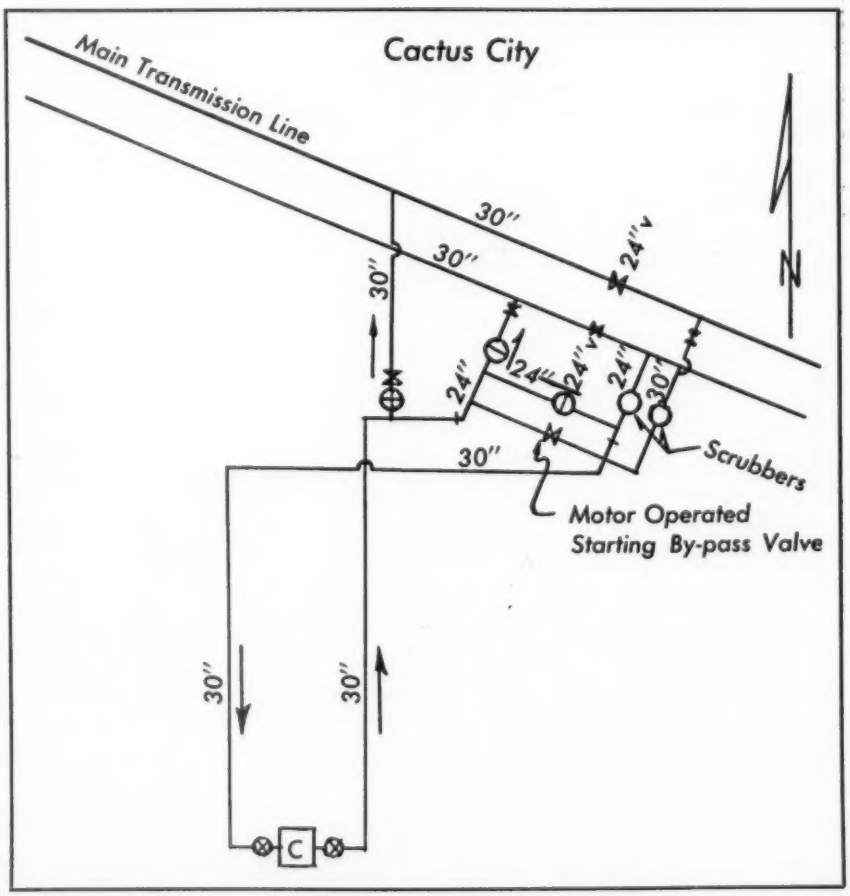


Figure 4, *right.* Simplified diagram of the piping diagram for the Cactus City station.

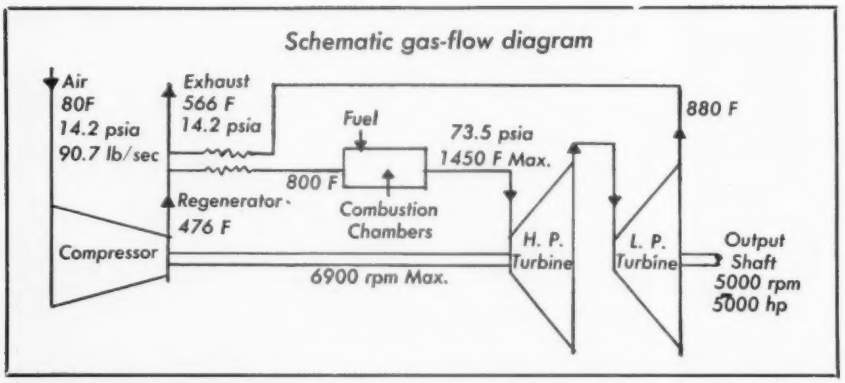


Figure 5, *left*. Schematic of typical gas flow in the stations operated by the California utility companies.

haust temperature of the load turbine. A temperature-actuated governor controlling fuel input operates to hold desired exhaust temperature. Maximum full load speed of high pressure shaft is 6,900 rpm.

Shutdown of the unit is essentially the reverse of startup, however, cooling may continue for as long as 3 hours after shutdown to cool bearings and seals and prevent misalignment due to temperatures. Electric power for pump requirements during this period is available from the station battery.

Maximum discharge pressure operating conditions have not yet been reached, as installation of the 3 reciprocating compressor units in the Blythe station is not complete. Conditions in January, 1954, when the flow rate was steady at 713 MMcf per day were:

	Intake Psig	Discharge Psig	R
Desert Center	610	736	1.20
Cactus City	535	632	1.18

On the day of maximum throughput to date, when 751 MMcf was compressed in the 24 hours, the 11 a.m. values were:

Desert Center	650	782	1.20
Cactus City	581	675	1.16

Cumulative operating statistics of interest are shown in the accompanying table.

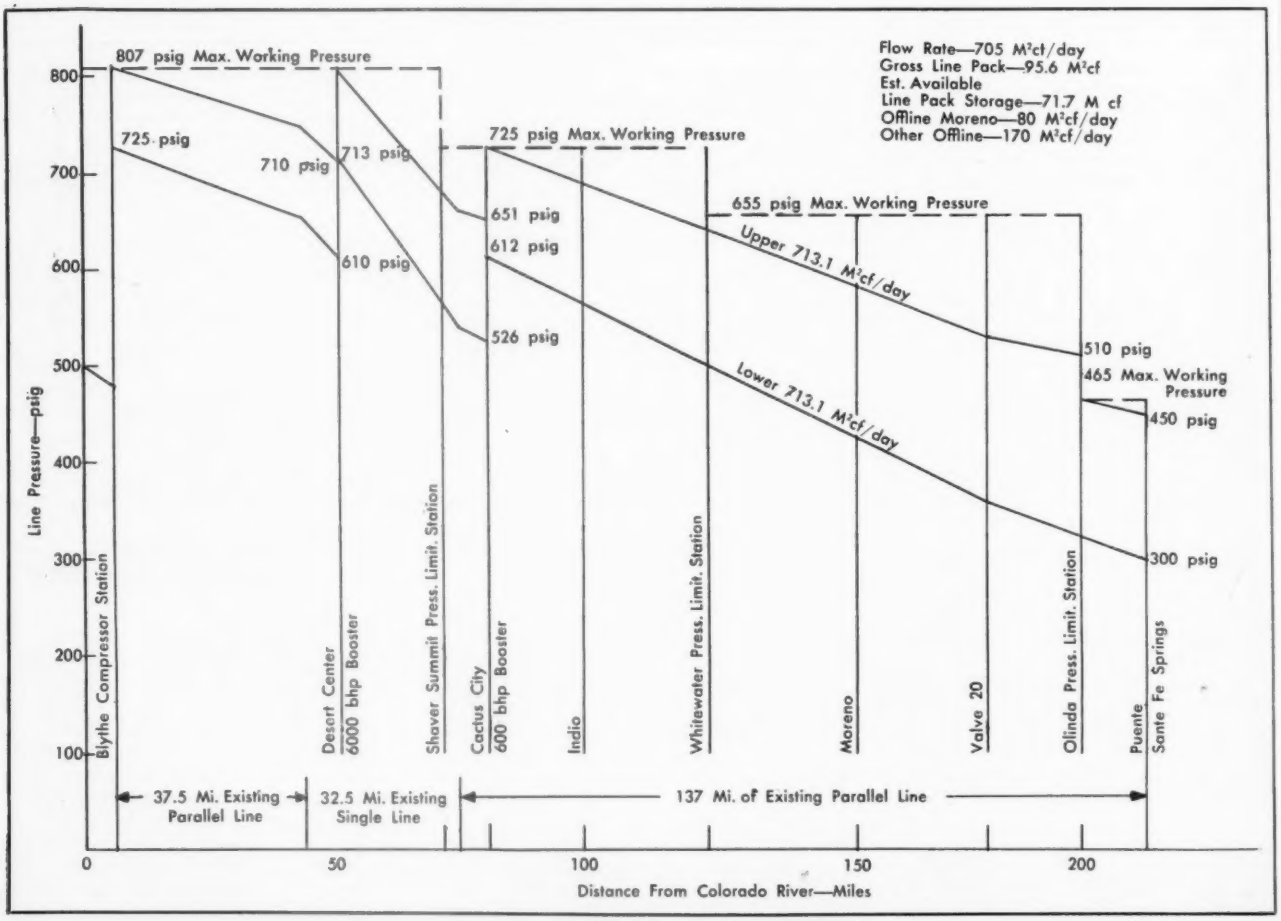
The chart in Figure 6 shows the anticipated operating conditions for varying levels of flow and quantities of gas stored within the pipeline system, computed on the basis of 6,000 hp of each of the turbine stations. The stations are run by a single operator on each shift.

Cumulative operating statistics

Desert Center and Cactus City stations
October 1, 1953 to June 1, 1954

	Desert Center	Cactus City
Total elapsed hours	5831	5831
Actual hours in operation	5208	4768
Per cent operation	89.5	81.8
Operating hours lost to main unit trouble	12	5
Per cent lost to main unit trouble	0.2	0.1
Operating hours lost to instrument and control shutdowns	28	28
Per cent lost to instrument and control shutdowns	0.5	0.5
Operating hours lost to inspection of units	322	304
Per cent lost to inspection	5.4	5.1
Operating hours lost to other operations	261	726
Per cent lost to other operations	4.4	12.5

Figure 6, *below*. These curves present the pressure gradient in the pipeline, from Blythe to Santa Fe Springs.



Natural Gas—A Commodity—Not Adaptable to Utility Regulation

. . . Paul Kayser emphasizes supply-and-demand concept

NATURAL gas was viewed as a commodity and, as such, is no more susceptible to utility-type of regulation than oil, coal, lumber, wheat and cotton, according to Paul Kayser, president, El Paso Natural Gas Co., in an address during the annual meeting of the National Editorial Association at St. Petersburg, Fla.

"It is a basic commodity in our economy," Mr. Kayser stated.

Gas is a commodity that, unlike some other commodities, must be found before it can be produced, Mr. Kayser explained to the assembled editors. He said that there is no more reason to regulate its price, at the point of production, than there is for any other basic commodity in our economy.

"Natural gas is the raw material used to supply gas utility service to the consumer, and constitutes about 10% of the delivered price to the consumer," he stated.

"Coal and oil are likewise raw materials used to supply electric utility service to the consumer. The price of coal and oil constitutes about 10% of the cost of electric utility service to the public. There are more than 40-million customers using electric service, while 21-million customers use gas utility service. If regulation of the price of gas in the field is required in the public interest for gas utility service, then it is obviously twice as important to regulate the price of coal and oil in the public interest for electric utility service.

"But in a free, competitive economy," he said, "prices of commodities at the point of production must be left to the law of supply and demand, operating under competition with other producers of the same commodity and competition of other commodities capable of serving the same purpose. In that way alone can the consumer be assured of an adequate supply to meet his growing demands."

Mr. Kayser used figures from the Bureau of Mines to establish the place of gas in the energy resources of the Nation. The 1953 data showed this percentage distribution:

Oil	40.7
Gas	23.1
Coal	32.3
Water power	3.9

"This," he emphasized, "shows our overwhelming dependence upon oil and gas for our high standard of living and, in fact, for our very continued existence."

In any consideration of governmental policy respecting oil and gas, Mr. Kayser continued, the question to be answered in the interest of the consumer is—Does it stimulate and encourage exploration or does it restrain and hamper it?

"The traditional policy of the government to date has been to encourage the exploration and development of our oil and gas resources," he said. "The mineral leasing Act affecting public lands, the depletion allowance, the write-off of intangible drilling costs, the opening up of the tidelands to private development, have all evidenced a fixed policy on the part of the Federal government to stimulate, foster and encourage the exploration and development of oil and gas resources of the Nation.

"Under this wise policy, we have clearly outstripped the world and, through the use of these energy resources, developed the highest standard of living the world has ever seen and the greatest productive capacity man has ever achieved.

Reversal of policy

"But this wise policy has been reversed by a recent 5-to-3 decision in the now-celebrated 'Phillips decision' by which the Supreme Court . . . held that the provisions of the Natural Gas Act applied to the production and gathering of gas. This decision made all producers of gas, who sell gas at the well or at any point in the field a 'natural gas company' under the Act, and placed the regulation of the sale of gas under the Federal Power Commission.

"The Act in Section 1 has a proviso that it shall not apply to the production or gathering of gas and the Commission for 16 years held that the Act did not apply to independent producers not operating or affiliated with an interstate pipeline. Notwithstanding these considerations, the Court held that the sale at the mouth of the well was subject to the regulation by the Commission.

"This regulation is a radical departure from all former policy of the Federal government. It is the first time the Government has regulated, in peace time, the price of a basic commodity at the point of production," he declared.

Regulation injurious to the economy

"Such regulation is injurious to the economy, because it will inevitably restrict exploration and reduce the quantity of gas available for the consumers demands; it will lead to the regulation of the other competing fuels, oil and coal, as well as other commodities, lumber, wheat, cotton, etc.; it further centralizes power in the Federal government and will destroy conservation regulation by the states; it is a socialistic measure reaching far beyond utility regulation and can only be made effective by the strictest socialization of all production.

"On the first point, it is too clear to argue that exploration for oil and gas is an operation involving extraordinary risks and is in no sense adapted to utility regulation. The price of the product found is necessarily the incentive for the search. The only purpose of price regulation is to restrict the price. If this regulation is effective from that standpoint, it obviously will restrict and discourage exploration. In addition, the multitude of regulations to be observed . . . will further hamper and retard the efforts of those desiring to enter the business of exploring for gas.

"On the third point, that the regulation of the price of gas in the field by the Federal government will destroy state conservation regulation, Gen. Ernest O. Thompson, member of the Railroad Commission of Texas . . . said . . . 'Whether the policy adopted by the state . . . be one of establishing a minimum price, as is done in Oklahoma and Kansas, or one of letting free competition control, as is done in Texas and New Mexico, the inevitable conflict with state conservation policies which will result from federal regulation of independent producers' prices is obvious.'

"He [Gen. Thompson] further pointed out a specific conflict between the conservation orders of the Railroad Commission of Texas and Order 174-B of the Federal Power Commission, issued in December, relating to independent producers. The Federal order provides that a producer may not reduce the amount of his sales in interstate commerce without the consent of the Federal Power Commission while the Texas Railroad Commission orders require, for the purpose of conservation, that certain quantities of gas be reinjected into the reservoir. In case of conflict, the courts have uniformly held that the Federal order is paramount and the State order is ineffective. This situation, unless corrected by amendment of the law, will certainly ultimately destroy the great conservation work of the states.

A socialistic measure

"On the fourth point," Mr. Kayser went on, "to the effect that the Federal regulation of the price of gas in the field is a socialistic measure and, to be effective must lead to the socialization of all production, we wish to point out to you that production of a commodity can be secured in only 2 ways—one, by paying a price at the point of production sufficient to stimulate people to undertake the production of the commodity and to compensate them adequately for such commodity when produced or, 2, by ordering certain persons to produce a given commodity and enforcing such order by the police power of the government. There are no other ways to secure production of a commodity to meet the demands of the consumer.

Turn to page 35—KAYSER

How Odorants Are Evaluated By Use of New Apparatus

by Ashley D. Nevers
Sharples Chemicals, Inc.
Subsidiary of
Pennsylvania Salt Manufacturing Co.

AMERICAN Gas Journal FEATURE

THE natural gas industry, almost from its inception, has devoted much time and money to attempts to determine the relative intensities, or "warning levels," of various materials which are under consideration for odorization of natural gas. The efforts of many engineers and scientists have been directed to such studies. Nevertheless, the possibility exists that odorant selection may often have been based more on experimental error than on the merits of the materials themselves. In other words, the inherent error of a determination may be larger than the actual intensity difference between 2 odorants.

It is an old story, but it bears repeating for emphasis, that in the measurement of odors no way has yet been found to eliminate the capricious fluctuations inherent in the operation of the human nose. The apparatus to be described here in no way alleviates this woeful situation.

There has been yet a further difficulty in the comparison of odor intensities of different materials. Methods for preparing a dilute mixture of odorized gas in air, of the proper concentration for odor tests, have in the main been cumbersome, time-consuming, and demanded considerable capital outlay. The room test procedure, long considered standard for the "best" determinations, has recently been carried to the near ultimate in refinement[4] but the cost, in money and in time, has increased, if anything. Appreciable time must be lost in purging the room while preparing either for a change in odorant concentration or for substitution of a different odorant.

Pipeline gas, once it is odorized, may be tested or for odor by observations either on accurately metered dilution, as described by Wilby[6] and White,[7] or on dilutions analyzed by an explosimeter and reported as a percentage of the lower explosive limit, as in the Casciola-Coryell instrument.[1] Such devices fill an important need in the industry but they can only be used to get the odor intensity-concentration relationship for the particular odorant in the gas at the time.

Means for preparing odorized gas on a purely laboratory scale have been described by Powell[2] and by Fieldner, *et al.*[3]

Each of these procedures suffers from the substantial time and manipulation involved. The latter procedure is limited to pure materials, since it depends on reaching equilibrium between the liquid odorant and the gas to be tested.

The Sharples Odor Comparator has been developed to avoid such difficulties. It may be used equally well for mixtures and pure compounds; experimental odorants can be changed rapidly so that several different materials can be tested in a day.

This apparatus will not find *routine* application by gas companies, but should be definitely useful on occasions when it is desired to select the best of a large number of likely odorants for field testing.

The main problem in the development of the apparatus was to find a means for continuously injecting an odorant into a gas stream at concentrations of the order of actual commercial use (0.5 to 1.0 lb/MMcf). On a laboratory scale, this involves pumping a dilute solution (2.6×10^{-3} gm/cc) of odorant in ethanol, at the rate of .005 cc/min into a methane stream of 0.9 liter/min. In the original form of the apparatus this injection rate was achieved by a slow speed screw device driving a hypodermic syringe; in the current portable form, the screw has been replaced by a cam driven by a synchronous motor.

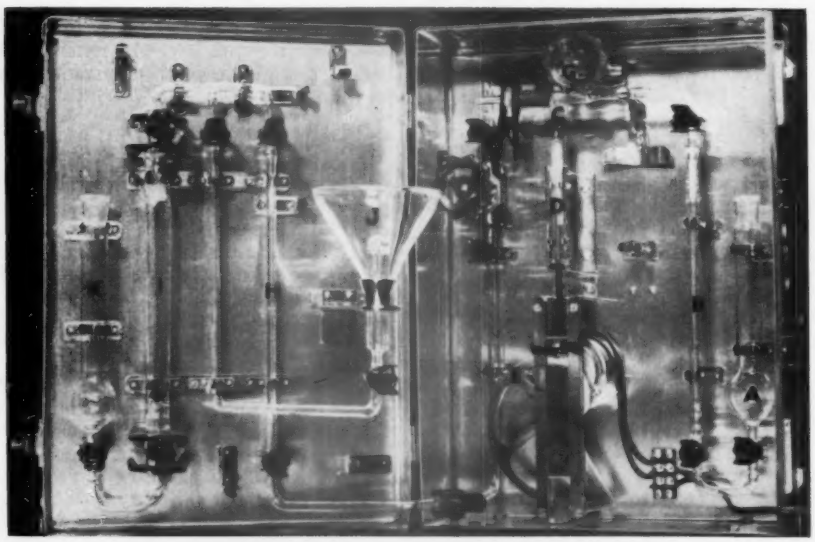


Figure 1. The set-up of the apparatus.

The apparatus is pictured in Figure 1. A flow diagram is presented in Figure 3.

Cylinder methane is dried and deodorized in passing through scrubber A which, in use, is packed with silica gel and activated carbon. The gas is then metered through rotameter B which has a range up to 1 liter/min. Odorant, or a solution of it in ethanol, is injected at point C from a 1 ml hypodermic syringe D (fitted with a 25 or 26 gage hypodermic needle) at the rate of .0067 ml/min. The syringe is driven at a constant rate by cam mechanism E, powered by a synchronous motor. The odorized gas is then split into 2 streams, in any desired ratio, by adjustment of stainless steel needle valves, F and G. One stream is vented to a laboratory hood or a point distant from the apparatus; the other stream is metered through rotameter H into a stream of air which has been deodorized by passing through scrubber K, similar to A. A source of pressurized air is necessary.

The air rate is measured by rotameter I. Subjects sniff the mixture at sniffing funnel J, which is fitted internally with symmetrically arranged orifices to direct the flow radially against the sides of the funnel.

The various glass elements are connected by ball-and-socket joints. Surfaces contacting the odorous mixture are mainly glass. There is a small amount of stainless steel, at the valves, and an insignificant amount of rubber at the point of liquid injection.

From the known flow rates, liquid injection rate, and solution concentration, the odorant concentration in the gas is readily calculated. The odorized gas thus prepared is suitably diluted with air for the test. The degree of dilution may be changed instantly by adjustment of one valve.

By taking apart 2 ball-and-socket connections, and relocating the funnel and support, the apparatus case may be closed and carried about.

The apparatus, arranged for closing and carrying, is shown in Figure 2. The design and assembly of the portable apparatus were developed by Fischer and Porter Co.

At the injection point the hypodermic needle enters the line for the carrier gas through a gum rubber sleeve and a small hole in the wall of the glass tubing. In

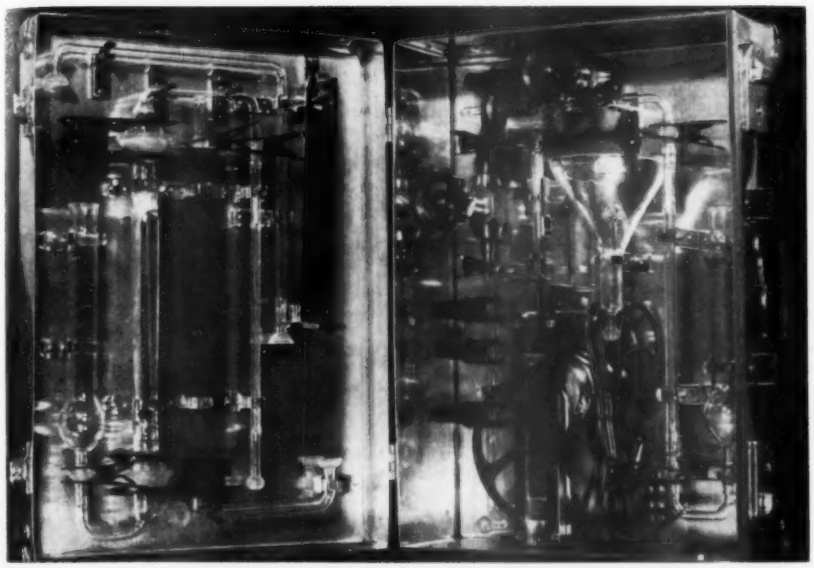


Figure 2. **Apparatus ready for closing and carrying.**

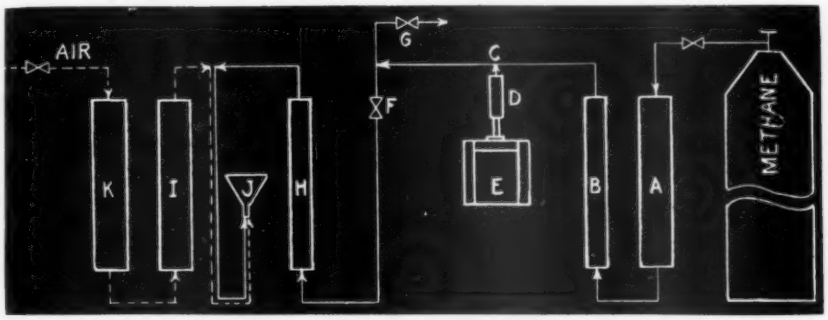


Figure 3. **Flow diagram.**

Figures 1 and 2 the sleeve has been slipped aside to show the internal arrangement. This is the only point at which the test gas contacts rubber. The needle is surrounded by a patch of wicking material, and a small nozzle is incorporated so that the gas will impinge directly on the tip with a sufficiently high velocity to vaporize the odorant mixture as fast as it issues from the needle.

Steps are being taken to patent the apparatus.

The best, the most reliable, method for carrying out the tests and interpreting the results, which at first appear to be a straight-forward operation, is actually subject to considerable complication and constitutes a problem which merits the serious attention of psychologists, physiologists, and statisticians.[2] A thorough analysis must include these considerations:

1. Best order of presentation of concentration changes;
2. Best concentration interval between successive concentrations;
3. Variations among individuals;
4. Variations of a given individual over an extended time: day-to-day, week-to-week, month-to-month;
5. Precision of a given individual over the short time interval required for a test;
6. Environmental factor such as temperature, humidity, noise level, ambient odor;
7. Physical conditioning factors such as colds, smoking, fatigue, time elapsed since latest meal;
8. Effect of odor character on perception of intensity;
9. Effect of odor intensity on perception of character;
10. Odor adaptation, "fatigue", effects.

Other considerations could be mentioned, but for the present purpose it will suffice merely to describe some procedures now being used, with fair success, with the Sharples Odor Comparator. These procedures have been evolved by successive refinements and seem to give reasonably consistent results in comparing odors against each other.

A panel composed of 6 or more members is preferred, although in specific instances this may not be feasible. It is, of course, desirable that the same people be used from one day to another but this also is a condition sometimes difficult to meet in practice. Whatever the panel composition, care is always taken that direct comparisons between odorants are made only with the same panel and on the same day.

Subjects are instructed to take *only* one or 2 natural sniffs in a standard position at the funnel, and to report privately to the operator with one of these responses:

0. No difference from air;
1. "Faint", or barely perceptible difference from air;
2. "Definite" difference from air.

In cases of doubt, the observer may get an immediate recheck against instrument air by request to the operator. Before each test, a fresh sniff of reference air is used as a control. The subject is told the identity of this air, when used as a reference, but occasionally air is also used as an "unknown" in the test. Observers are asked not to smoke or discuss their observations until the entire series of tests is over.

With a constant methane rate, air rate, solution concentration, and liquid injection rate, the flow of odorized methane into the air stream is varied. With a given observer, successive changes in the concentration of gas in air are thus presented. No particular order of presentation is chosen; test concentrations are selected by the operator, first, to bracket the critical ranges where responses fluctuate from 0-to-1 and from 1-to-2 and, second, to get several check readings within the brackets thus defined.

Table 1 illustrates some typical data obtained by the above procedure, for 3 different pure mercaptans A, B and C.

The table points out the difficulties of systematically interpreting the data and it also shows an interesting lag-effect in the carry-through of the odor. Note that for Observer Z and Odorant A, part of the observations, those *not italicized*, indicate a much higher threshold than the others. The same effect is noted for Observer X and Odorant A. It happens that these were the first tests made in the whole array. The italicized data for Z were obtained later, after running all other observers; these latter data show a substantial apparent increase in Z's sensitivity.

This effect has occasionally, but not always, been observed in other tests. When it occurred, it was always at the beginning and usually disappeared after about 10 minutes. There appears to be some preconditioning necessary for stabilizing the operation of the instrument. The phenomenon is not understood, although sorption equilibrium is probably one important factor.

With this in mind, we are probably justified in ignoring X's data on A and Z's first data on A, but Z's italicized data will be retained. It is clear that the ranking of intensities is different with different individuals, and that differences when they do exist are slight. In the final analysis we can only say that no significant differences exist among the 3 mercaptans.

To get a more quantitative evaluation, another approach has been tried recently. Table 2 presents the data. Concentrations were presented in the order given in the left-hand column; this order was the same for each observer and each odorant. Each concentration of each odorant was presented exactly twice to each observer. This assures equal weights for each observer in

Table 1

Intensity Ratings of Pure Mercaptans A, B and C

Odorant Concentration (lbs./10^8 cf gas-air)	Observer U			Observer V			Observer X			Observer Y			Observer Z		
	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
0					1, 0				0	0			0		
.02	0, 0+	1, 1, 1		1	1, 2, 1			0, 0, 0	1	2, 2, 2	2, 1, 1	2	*1, 0, 0*	2, 2, 1	
		1			1, 0			0			2			1	
.04	1+	2, 2, 1+	1, 1, 0+	1	2, 1, 1	1, 1, 2		1, 0+	2, 2, 2		2, 2, 2	2, 2, 2	*2, 0*	1, 2, 2	0, 1, 1
					1	1		0, 1	1					2	1
.06	1+, 2			2, 1	1	1			2	2		2	*2, 2, 1*		2
.07	1		1	2	2	2		2		2				2	2
.09	2, 2, 1+	2	2, 2, 2	2, 1, 1	2	1, 1, 1	0	2	2, 2	2	2	2	1+, 1	2	2, 2, 2
	1												2		
.13	2			1			0			2			1		
.19			2	2		2	1, 0		2			2	1, 1, 1		2
.30							1, 0						1, 2, 0		
.005						0			2, 1	2, 2		2, 2			
.009										1					
Intensity rank (Strongest to weakest)		B			No			C			A, C			B	
		A, C			Difference			B			B			A	

Table 2

Intensity Ratings of Pure Mercaptans A and D

Order of presentation	lbs/10^8 cf gas-air	Observer U		Observer V		Observer X		Observer Z		Odor Rank	
		A	D	A	D	A	D	A	D	A	D
4	.009	—1, —1	—1, 0	0, 0	0, 0	0, 0	0, 0	0, 0	0, 0	0.25	0.125
2	.02	1, 2	1, 0	1, 1	0, 0	0, 0	1, 0	0, 1	0, 0	0.75	0.25
3	.03	1, 1	2, 1, —2	1, 2	0, 0	0, 2	2, 0	0, 2	1, 1	1.125	1.0
5	.06	2, 0	2, 2	2, 2	1, 1	1, 1	2, 1	2, 2	1, 1	1.50	1.275
6	.07	2, 2	2, 2	2, 2	2, 2	1, 0	2, 2	2, 2	2, 2	1.625	2.0
1	.09	2, 2	2, 2	2, 2	1, 2	1, 1	2, 2	2, 2	2, 2	1.75	1.875
8	.13		2	2, 2	2, 2	2, 1		2, 2			
7	.19	2	2, 2	2, 2	2, 2	2, 1	2, 2	2	2, 2		
9	.30					2, 1					

the subsequent averaging. "Odor Ranks" in the right-hand columns were calculated by the formula:

$$\text{Odor rank} = \frac{(\text{intensity rating} \times \text{tests}^* \text{ at indicated intensity})}{\text{total tests}^*}$$

* Number of tests

Example: For A at .04 concentration level:

$$\text{Odor rank} = \frac{(3 \times 1) + (3 \times 2)}{8} = 1.125$$

Mercaptans A and D are thus shown to be equal, or nearly so, in intensity. Differences between odor rank are slight, and ranking order appears to depend on the concentration level.

Although this article has the primary object of describing an apparatus and procedure for odorant evaluation, it may not be out of order to go briefly into the theory of the intensity-concentration relationship. The Weber-Fieldner law is usually considered to hold true. This law states that the odor intensity (I) is a linear function of the log of the odorant concentration (C):

$$I = m \log C + b$$

No unit is defined by which I may be directly measured. I, indeed, is a subjective quantity and the best way of quantifying it is by the use of JND's (just noticeable differences) above the threshold of detection. Engineers and physical scientists understandably shrink from this kind of a unit, but analogous units have been successfully used in the fields of visual and auditory perception as well as other biological responses.

The statement has ocasionally been heard that "to double the odor level, one must multiply the concentration by ten." This statement is, in general, inaccurate. If the Weber Law holds:

$$\begin{aligned} I &= m \log C + b \\ 2I &= 2m \log C + 2b \\ &= m \log (C^2) + \log (k^b) + b \text{ (where } k = \text{base of logarithms)} \\ &= m \log (C^2.k^{b/m}) + b \end{aligned}$$

Thus, to double the intensity, C has to be multiplied by $C.k^{b/m}$.

By an analogous operation, it is seen that to multiply the intensity by any factor, n, the concentration must be increased to

$$C^n.k^{b/m(n-1)}.$$

This is the general solution; it applies without restriction as to units or the base of logarithms employed. It is necessary, of course, to determine the values of b and m experimentally.

In practice, the application of the equation may be simplified considerably, as follows:

The term $k.^{b/m(n-1)}$ becomes 1 when b is 0.

This happy situation can be arranged by choosing units for C, such that $C = 1$ at the threshold. Then, $\log C = 0$, $I = 0$, $b = 0$. The concentration is now expressed as a multiple of the threshold concentration.

Using these units, to multiply the intensity by n, the concentration must be multiplied by C^{n-1}. This is true because the term $k^{b/m(n-1)}$ has been reduced to 1.

The tables show that the threshold for some mercaptans is about 0.01 lb./10^8 CF gas-air mix, equivalent to gas containing .01 lb/MMcf and diluted to 1% in air. We will choose 1% gas in air as an appropriate basis because this is about the level at which we want an odor to be readily detectable.

0.5 lb/MMcf is 50 times the threshold, on the above basis. To double the odor of the 1% gas-in-air mixture, the concentration of odorant in gas must be multiplied by 50; the final concentration must be 25.0 lb/MMcf. This is not as ridiculous as it first appears. The gas is already at a high odor level; to double this level will naturally require some doing.

The question remains, "What do we mean by *'doubling'* the odor level?" In conformity with this discussion, this really means that the number of JND's above the threshold is doubled. It must be remembered that the symbolism 0, 1, 2 as used in this paper probably does not correspond to the number of JND's of intensity. "1," as defined, is a valid JND above zero, but "2" is not necessarily twice as strong as "1." The same comments apply to the more usual gas industry designations where the respective odor levels are (1) "barely detectable," (2) "readily detectable," and (3) "strong."

Another difficult question in practical intensity measurement: "Should odorant selection be based on threshold measurements or on measurements at higher intensity levels?"

If we choose the former basis, there is always the possibility that, at use concentrations, an odorant of lower threshold is actually less potent than one with a higher threshold. This may happen if the slopes (m) of the I vs log C plots are sufficiently different.

If, on the other hand, measurements are made at the so-called "readily detectable" level, there is the problem of how to define this term to the satisfaction of everyone on the panel. There is also the problem of assurance that an individual's conception of this term does not fluctuate over the space of time required for the tests. Use of an external reference standard suggests itself here, and this procedure has been successfully used by Wilby[6] in measurements on commercially odorized gas. Due to variations among individual subjects it may be necessary to be somewhat arbitrary in the choice of the exact concentration of odorant used for the external reference. The standard odorant must have the same character as the odorant under test to avoid confusion of intensity and character phenomena. If intensities are compared for odorants of substantially different character (as methyl sulfide and Spotleak 1009, for example), the proper choice of a standard may be a severe problem.

Because of the relatively precise definition available for the term "threshold," comparisons at this level should be preferred if it can be shown that threshold comparisons yield the same ranking order as comparisons at higher intensities. The data of Fieldner *et al*[3] and White[7] indicate this is probably the case but additional work is desirable to confirm it.

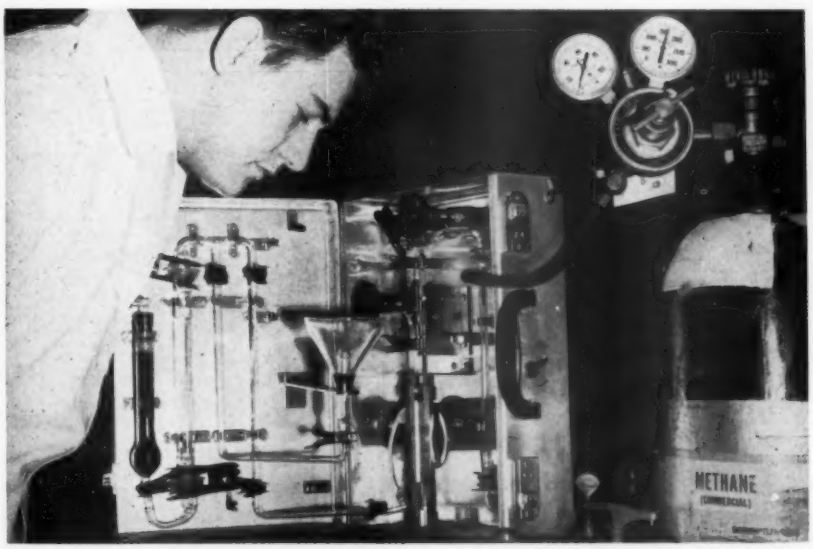


Figure 4. **Apparatus, connected with gas supply and ready for use.**

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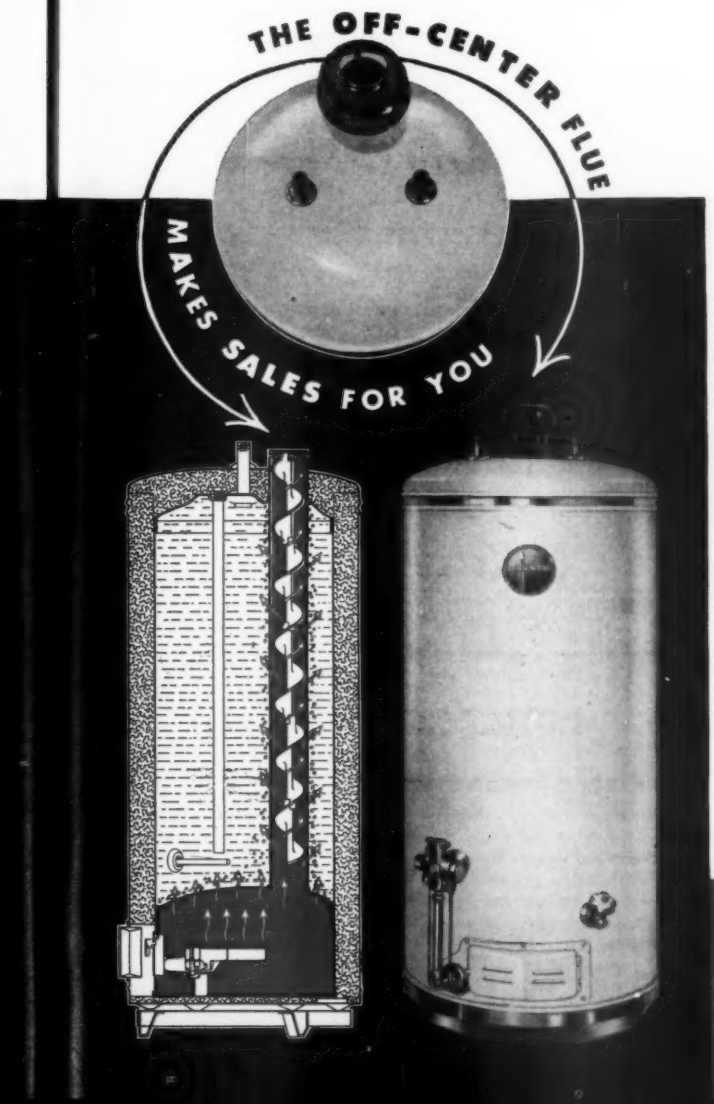

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Price Indexes of Gas, Other Fuels and Electricity

SHORT INCREASE IN RETAIL GAS

November statistics on the retail cost of gas show less increase than was recorded for October. Residential space heating gas averaged 0.2% higher than October and non-space heating gas was up 0.1%. The September-October gas rise averaged 0.8%.

U. S. Bureau of Labor Statistics notes that its surveys for November did not reveal any actual rate changes, in the cities included for the index. The reflections of cost-change, to the residential consumer, are the result of adjustments for fuel costs and for thermal content.

ELECTRICITY There was a change in electric rate for one New England city. On the average, net monthly bills were unchanged.

BITUMINOUS COAL The trends for bituminous were mixed. In 7 of the 26 cities surveyed, there were increases ranging from $0.10-to-$1.05 per net ton. Decreases in 2 cities were $0.30 and $0.85 per net ton.

ANTHRACITE Prices advanced in 3 of the 9 cities in the BLS survey; the amounts ranged from $0.50-to-$1.00.

FUEL OIL An increase of $0.08 per 100 gals., in New York, was reflected in the November petroleum index with a rise of 0.2%. The November index was 1.2% below the comparable 1953 level.

Source: Bureau of Labor Statistics, U. S. Department of Labor (1947-1949 = 100.0)

	1954											1953		
	Nov.	Oct.	Sept.	Aug.	July	June	May	Apr.	Mar.	Feb.	Jan.	Dec.	June	Jan.
GAS														
Space heating	115.7	115.5	114.6	114.5	114.4	114.3	114.5	114.1	113.9	113.7	113.6	113.6	111.2	108.9
Non-space heating	109.8	109.7	108.8	108.8	108.9	108.8	108.9	108.8	108.8	108.8	108.8	108.8	107.2	106.4
Natural														
10 therms	100.6	100.5	99.4	99.5	99.9	99.7	100.0	99.9	99.9	99.9	100.0	100.0	98.7	98.3
25 therms	113.9	113.7	112.3	112.2	112.5	112.3	112.6	112.3	112.3	112.2	112.2	112.2	110.2	108.9
Manufactured														
10 therms	109.5	109.5	109.5	109.4	109.2	109.4	109.4	109.4	109.4	109.4	109.4	109.5	107.4	106.9
25 therms	110.3	110.3	110.3	110.2	109.4	109.6	109.5	109.6	109.6	109.6	109.6	109.7	108.4	107.8
Mixed														
10 therms	96.4	96.4	96.4	96.4	96.4	96.4	96.4	96.4	96.4	96.4	96.4	96.4	96.2	96.2
25 therms	100.4	100.4	100.4	100.4	100.4	100.4	100.4	100.4	100.4	100.4	100.4	100.4	100.0	100.0
All types combined														
10 therms	105.6	105.6	105.0	105.1	105.2	105.2	105.3	105.2	105.2	105.2	105.3	105.4	103.9	103.5
25 therms	113.9	113.8	112.7	112.6	112.7	112.6	112.8	112.6	112.6	112.5	112.5	112.5	110.7	109.6
ELECTRICITY														
Composite	105.5	105.2	104.9	104.8	104.8	104.5	104.5	104.5	104.5	104.4	103.8	103.8	104.1	104.4
SOLID FUELS														
Bituminous—All sizes combined	119.9	119.4	118.7	117.9	117.4	117.2	117.2	119.5	120.6	120.6	120.7	120.6	117.3	119.8
Anthracite—All sizes combined	129.2	128.5	126.5	126.4	124.7	124.1	123.1	130.2	135.0	135.0	135.0	135.0	130.6	135.9
PETROLEUM														
Fuel oil No. 2	121.2	121.0	118.8	118.5	117.7	117.7	118.1	120.6	122.1	123.2	121.9	120.9	117.9	116.6

Residential Appliance Shipments

Source: Gas Appliance Manufacturers Association (000 units)

	1954											1953		
	Dec.	Nov.	Oct.	Sept.	Aug.	July	June	May	Apr.	Mar.	Feb.	Jan.	Dec.	June	Jan.
Ranges														
Gas	143.2	170.5*	206.7*	203.9	179.4	134.5	174.3	163.8	172.4	188.2	152.9	137.0	134.4	166.6	169.2
Electric	—	90.7	96.4	113.8	86.8	91.4	98.1	94.5	106.0	131.9	125.3	116.4	84.4	129.2	124.8
Water heaters														
Gas	170.7	179.1	202.0	205.5	207.1	190.3	206.7	195.6	200.8	187.8	175.0	164.4	141.9	181.2	189.9
Electric	—	57.1	63.7	80.4	66.1	66.6	73.0	69.8	70.0	73.6	60.9	53.9	44.3	68.4	62.3
Furnaces, gas	55.8*	71.7*	77.3*	82.0	75.4	53.1	57.3	49.9	43.6	36.6	31.6	31.0	33.5	49.8	31.1
Boilers, gas	3.9*	7.0	10.8	10.9	8.9	6.0	6.2	6.0	4.3	3.9	3.0	2.9	3.1	6.2	2.7
Conversion burners	7.7*	16.0	32.2	35.9	29.4	19.9	19.7	22.5	14.7	7.4	8.7	8.8	8.4	24.8	9.7

* Preliminary totals.

Index of Yields: Selected Utilities Stocks

Expressed as percentages

	1955	1954											1953	
	Jan.	Dec.	Nov.	Oct.	Sept.	Aug.	July	June	May	Apr.	Mar.	Feb.	Jan.	Dec.	Jan.
Transmission companies	4.25	4.27	4.40	4.40	4.17	4.17	4.25	4.04	4.08	4.15	4.17	4.25	4.21	4.39	4.04
Transm. & distrib. companies	5.00	5.08	4.69	4.70	4.61	4.67	4.88	5.01	5.01	5.11	5.27	5.39	5.39	5.54	5.02
Manufactured & mixed companies	4.57	4.88	4.72	4.38	4.16	4.26	4.36	4.45	4.46	4.67	4.68	4.66	4.66	4.91	4.87
Class "A" electric companies	4.13	4.20	4.37	4.46	4.36	4.31	4.31	4.60	4.64	4.70	4.68	4.92	4.92	5.10	5.08
Class "B" electric companies	4.68	4.72	4.69	4.77	4.74	4.70	4.78	4.83	4.94	4.94	4.93	5.01	5.14	5.23	5.19

This is a straight arithmetical index of comparative yields obtainable on a selected group of gas and electric utility industry common stocks.

The companies comprising this index have been selected by the AMERICAN GAS JOURNAL as providing a representative cross-section of each industry, from the standpoint of geographical diversification and of the relative importance of the individual companies in their areas.

No effort has been made to weight the average to give effect to changes in capitalization or in dividend rates because the yields afforded on the issues reflect such changes. The index is designed to show the rate of return and not necessarily market movements on the stocks comprising it.

This index is compiled from: natural gas transmission companies, 5; natural gas transmission and distribution companies, 5; manufactured and mixed gas companies, 4; class "A" electric companies, 4; class "B" electric companies, 5.

Credit Tightening is Predicted as Business Recovery Continues

by **John F. Falvey**
Financial Editor

RECENT recession in the bond market has been far sharper than had been anticipated, as witness the substantial increase in interest costs to corporate borrowers. In its sale of $30 million mortgage bonds, Consumers Power Co. of Michigan last month had an interest cost of 3.17% on double A rated obligations. As against this, Columbus and Southern Ohio Electric Co. last fall succeeded in obtaining $10 million of new money at an interest cost of 3.135% on A rated mortgage bonds.

While the uncertainties have been fairly substantially discounted, some further tightening of credit is in prospect, according to the economic forecasters, who view the prospect favorably.

Considerable pressure has been exerted on bond prices by the tremendous increase in available real estate mortgages, chiefly in the residential field, and by the predilection of lenders for this type of security, with its approximately one-third greater yield than is obtainable from high grade corporate bonds. Why reach for corporate issues providing a yield of from 3 to 3.15%, depending on their triple A or double A rating, institutional lenders reason, when a net return of 4% or better, net after expenses, is obtainable from real estate mortgages.

Down payment reduction

Under the stimulus of greatly reduced down payments, and in many instances no down payment whatever, mortgage borrowing in the third quarter of 1954—the latest period for which actual statistics are available—real estate mortgage debt increased 40% more than in the comparable 1953 period, and for the last half of 1954 it is estimated to have increased by nearly $7 billion. This is nearly two-thirds of the $12 billion increase expected to be recorded for the whole year, which in turn compared with the figure of $10 billion shown for 1953 every indication points to continuance of this rapid rate of increase to date in 1955.

Real estate mortgages at last report were claiming about half of all new investments by life insurance companies, a substantial portion of the time deposits of the commercial banks and practically all the lendable funds of the other institutional investors and lenders.

Competition which the bond market has been experiencing from real estate mortgages may not have run its course, since the liberalized mortgage provisions of the National Housing Act of 1954 only went into effect last October 1 and mortgage statistics to date have not fully reflected their impact.

New housing starts in 1955 currently are estimated at a minimum of 1,300,000 and may reach 1,500,000, according to predictions made recently at the annual mortgage conference sponsored by New York University in co-operation with the Mortgage Bankers Association of America. The larger figure would be something to worry about, because it probably could not be sustained, in the view of Dr. George T. Conklin, Jr., adjunct professor of finance at the university, and vice-president of Guardian Life Insurance Co. of America.

He figures the potential net new mortgage demand this year at $13 billion and declared that the increase in disposable funds for mortgage investors would be sufficient to take care of this potential, although at a rising level of mortgage rates. But the increase in disposable funds would be inadequate to sustain a $15 billion mortgage potential, he warned, in the event of a 1,500,000 level of housing starts in 1955.

Mortgage yield is yardstick

More and more, it was pointed out at the mortgage conference, the yield on insured and guaranteed mortgages was becoming the yardstick for institutional lending rates—and the boom conditions in home building are the greatest worry of the money managers.

In its recent declining action the bond market has been reflecting also the change taking place in the government's monetary policy from an easy money basis to one of cautious restraint. Following recent boosting of margins on stock purchases the government has brought along its 40-year 3% bond to channel some of the longer range investment money away from mortgages and also to firm interest rates as a brake against possible speculative excesses.

Continued business recovery is envisioned in economic circles at least through the first half of this year, with some predictions on the rosy side carrying into the early part of 1956. The favorable trend is expected to be stimulated by the same economic forces which sparked the recovery in the latter half of last year. Public works expenditures are expanding; construction—commercial as well as residential—is running at a high rate; demand for durable and nondurable goods continues strong; individual spending is on the rise; and liquidation of inventories has run its course. In fact, there are signs that inventories in some lines again are in course of accumulation.

Demand for bank credit in 1955 is expected to be somewhat larger than in 1954, due to the higher level of general business, the reversal of the inventory trend, expansion in consumer and realty loans, and the acceleration of tax payments. All indications point to an adequate supply of money and credit, however, to take care of all legitimate requirements of the public and private segments of the economy.

While the economists are fairly well agreed that further tightening of credit would be a good thing for the economy, they are not in complete accord as to what steps the Federal Reserve may adopt toward curbing the credit supply. By and large, however, they do not foresee a return to the tight money conditions which prevailed in the spring of 1953 and which had such disastrous results to the bond market and to the trend of general business.

Now that the Treasury has come along with its 40-year bond aimed at extending government debt maturities and at siphoning off some available funds from the mortgage market, some further tightening steps by the government are anticipated, such as still higher margin requirements in stock purchases, a higher discount rate, and additional scaling down of bank reserves through sale of bills.

Pension funds growing

A development which has become increasingly important to the bond market during the past year or so is the great growth of public employee pension funds, according to a study recently made by Disque Dean of Union Securities Corp. These funds dominated the high-grade, long-term corporate bond market in 1954, accounting for more than $1 billion, or 36% of the $2.8 billion publicly offered corporates rated A or better. Roughly 60% of the Funds' money available for investment last year was used to take advantage of the better yields available in corporate bonds.

Only recently have these public pension funds begun to compete with institutions for investments in the corporate bond market, study discloses. The trend reflects both the rapid growth of these funds and the liberalization of their investment policies. At the 1954 year-end public funds had assets of nearly $10 billion and they are expected to have an additional $1.8 billion available for investment in 1955.

High-grade corporate bonds now qualify as pension reserve investments for more than three-quarters of the funds.

Even if a business depression were to be witnessed, it goes on to point out, a more moderate rate of growth should be shown, since, unlike private enterprise, civil employment should remain approximately constant during such periods. During periods of adverse economic conditions, moreover, corporate financing would be less active and the public investment problems would be more severe. The sole apparent solution to this problem, according to the sponsor of the study, is a further broadening of the field of investment.

The study contemplates that during 1955 the public pension funds will be even more important factors than heretofore in the long-term revenue and corporate bond markets. It expects that the trend toward liberalization of investment requirements will be accelerated concomitant with furtherance of their remarkable growth. These funds, it concludes, have taken their place as major institutions alongside the insurance companies and other savings institutions as investment vehicles.

INDEX OF YIELDS:

SELECTED UTILITIES STOCKS

See bottom of facing page.

American Gas Journal FEATURE

Negligence Is The Factor in Defective Equipment Liability

by **Leo T. Parker**
Attorney at Law
Cincinnati

A GREAT deal of interest has been shown in the past over the question; is the dealer, distributor or manufacturer of defective gas equipment liable in damages, to a purchaser who is injured as a direct result of the defects of such merchandise?

The court answered this question in the case of Birdsong v. General, 90 Fed. S. 164. Here one Birdsong sued a manufacturer for heavy damages claiming that the manufacturer made and delivered to his distributor merchandise that was defective, and that the defects resulted in an accident in which Birdsong was seriously injured. The court refused to hold that Birdsong could recover damages saying:

"To recover a judgment plaintiff (Birdsong) must prove that General (manufacturer) negligently manufactured and delivered to Jacobs Brothers (distributor) this defective safety equipment, regardless whether recovery is based upon that negligence or upon breach of warranty by such negligence."

Manufacturer is responsible

This court explained that the primary responsibility for negligently manufacturing and delivering to a dealer or distributor defective equipment or merchandise is upon the manufacturer. However, the court said that if the testimony shows that the merchandise was defective and caused his injury, the injured purchaser may, if he prefers, sue the distributor or dealer from whom he purchased the merchandise or equipment. Then, if the purchaser recovers damages the dealer or distributor may obtain complete indemnity from the manufacturer, if the testimony shows that the distributor's negligence did not contribute to the injury, and also that the dealer was not negligent. See MacPherson v. Buck, 217 N. Y. 382; and Foley v. Pittsburgh, 68 A. (2d) 517.

Hence, the courts have laid down the law that neither a manufacturer nor a distributor or dealer is liable in damages to the purchaser of defective equipment or merchandise unless positive testimony is given that the same was defective and that negligence of the manufacturer or dealer resulted in the defect or dangerous condition. In other words, if the defect is inherent or concealed, neither the manufacturer nor the dealer is liable.

Therefore, if the defect in a gas appliance is not seen by a gas company's officials or employees, who purchased the appliance from a manufacturer, the one sustaining injuries while using the appliance cannot recover damages from either the manufacturer, or the gas company which sold the appliance.

Jury will decide

Last month a court held that where there is doubt whether a gas explosion was caused by negligence of a user or distributor of a gas appliance, a jury will decide the issue.

For illustration, in Stadick v. Olson's Hardware, testimony showed; one Stadick purchased a gas range from a distributor who installed the unit. In addition to selling the range, the distributor sold the gas and performed the service of connecting the range to the system.

One morning Stadick was wakened by a noise in the kitchen. He went downstairs and found the noise coming from behind the stove. He checked the burner controls and they were off. He opened the oven door and there was an explosion. Stadick was injured, the building was damaged and a fire started.

Previous to the explosion Stadick had, on three occasions, called the distributor to remedy defects in the operation of the range or system. Twice because the pilot lights were not functioning properly, and a third time because gas was leaking outside the house.

In view of this testimony, the court held the distributor liable in damages to Stadick, and said:

"When the explosion occurred the only fire in the house was in the pilot lights on the stove. The explosion occurred when the oven was opened by the plaintiff (Stadick). The conclusion is inescapable that the explosion was caused by an accumulation of gas in or about the stove. If the testimony of Stadick is to be believed, the only reasonable inference is that the gas that exploded escaped from a defect in the system. The fact that a verdict was rendered for the plaintiff indicates that the jury found the evidence of Stadick to be credible. On the basis of the evidence it was logical for the jury to infer that the injuries resulted from the explosion of gas that had escaped from the system that had been improperly installed by the defendant (distributor) whose negligence in making such an installation was the proximate cause of the damages which the plaintiff (Stadick) suffered."

Danger not apparent

A few weeks ago, court rendered a decision to the effect that where the danger of gas explosion is not apparent to a gas company's employees, there can be no liability. This is particularly so if the testimony shows that an intervening cause resulted in the injury.

For illustration, in Rader v. Nashville Gas Co., 268 S. W. (2d) 114, the testimony showed; The Nashville Gas Co. maintained a gas pipeline approximately 20 feet from a building owned by one Rader. Previously, the company had removed a gas meter from an adjoining vacant lot and left a gas pipe sticking up about 14 inches above the ground, without protection and with nothing to indicate that it was a gas line. Without notice to the gas company the owner of the lot hired a contractor to grade and fill this lot. Heavy machinery was used and parts of the lot were filled with rocks and dirt rolled down by heavy rollers. Soon afterward an explosion occurred in Rader's building, adjoining the vacant lot, and he sued the gas company. Rader alleged that the gas company unlawfully and negligently allowed gas to escape from its pipes and flow through the ground until it reached a conduit in the corner of his building, accumulated between the ceiling and roof, and resulted in the explosion.

During the trial, testimony was given that after the explosion workmen dug a hole and found that the gas line under the ground had been broken and gas was escaping from it.

Company is not liable

It is interesting to observe that the court refused to hold the gas company liable in damages to Rader and explained that although the gas company was negligent in removing the gas meter and leaving the gas line protrude from the ground, yet such negligence was not the proximate cause of the explosion, but that the hauling and dumping of fill material and rolling the heavy machinery over the location of the pipes was the intervening cause of the accident. This court said:

"The break in the pipes was over 3 months after the meter was removed by the defendant and if the pipes had not been broken by the intervening agency it is reasonable to presume that no gas would have escaped. We cannot say that this defendant (gas company) was guilty of any negligence in not foreseeing that this lot would be graded and filled and run over by heavy machinery and equipment and the gas pipes under the ground broken, allowing gas to escape and flow under ground to the building of the plaintiffs (Rader) next door to the lot, over 90 days after the meter was removed."

This court explained that an injury that is the natural and probable consequence of an act of negligence on the part of a gas company is actionable. But an injury which could not have been foreseen nor reasonably anticipated, as the probable result of an act of negligence, is not actionable.

What is reasonable delay?

A letter from a gas company official reads in part, as follows: "Please give me some dependable legal data on how long a purchaser of unsatisfactory gas appliances can delay before he rescinds his contract. Very often our company installs appliances and equipment which a purchaser uses for sometime before he enters his complaint."

Recently a court held that delay of 3 months by a purchaser in rescinding contract for installation of unsatisfactory heating equipment is reasonable, and does not forfeit the purchaser's right to rescind the contract and recover damages.

In Elias v. Walker, 256 Pac. (2d) 298.

Turn to page 38—**PARKER**

AMERICAN Gas Journal FEATURE

How Economic Factors Affect the Design of Pipelines

by **W. B. Poor**
Ford, Bacon, and Davis, Inc.

THE economics of natural gas transmission are each year becoming more competitive, not between pipeline companies particularly, but primarily as the delivered price of gas approaches, or equals the price of competitive fuels—coal and oil.

This situation is brought about by the escalation of the field price of gas, where 20¢ per Mcf is now not unusual, increased steel prices, increased cost of rights-of-way, more stringent control by state authorities, and the approaching adoption of the much needed revision of Section 8 of the ASA Code B31.1 for pressure piping.

In order to maintain a competitive position in the fuels market, the pipeline companies are now faced with the ever increasing responsibility of designing their facilities with due regard to economic factors not heretofore given prime consideration.

Basically, the economic factors affecting engineering design appear to be:

1. The character of the market to be served and development of load factor;
2. The availability and economics of gas storage fields;
3. The economic determination of line size versus ultimate installed horsepower;
4. Careful predetermination of the pipeline location.

The character of the market to be served establishes the load factor at which the pipeline will operate, except as the load factor is increased by means of interruptible industrial sales, peak shaving by customer utility companies with manufactured or LP gas facilities, or storage facilities located reasonably close to the market area.

The summation of the individual load classes for which there is a market demand establishes the character of the market to be served and falls into 8 distinct classifications, with a range in load factor as follows:

Residential general	75—85
Commercial general	75—85
Residential space heat	23—28
Commercial space heat	23—28
Small industrial	60—75
Large industrial firm	60—75
Industrial interruptible	None
Company use and unaccounted for	70—75

A typical annual and maximum day load for a service area of 1,000,000 population might then run as shown in Table 1 for the firm load requirements where the area experiences a 7,000 degree-day-deficiency (DDD).

Such a load factor imposed upon a transmission line is, generally, economically unfeasible, as the facilities would be operated on an annual basis at only 41.2% of maximum day capacity. The remedy may be found in one of 3 ways or in a combination of them as follows:

1. Interruptible industrial sales;
2. Peak shaving;
3. Natural gas storage operations.

For example, if as much as 45,000 MMcf of interruptible industrial gas may be sold —and this is almost entirely a price situation—the load factor to the pipeline becomes 86.1%, a fairly desirable situation. If, however, the interruptible sales could be increased to 58,600 MMcf annually, the load factor would approach 100% and the pipeline could be operated at design capacity each day of the year.

Peak shaving through the use of customer-companies' existing manufactured gas equipment or liquefied petroleum-propane or butane air facilities—although being the least desirable method of increasing the pipeline load factor, does have some merit, especially during the early years of load growth after conversion to natural gas.

Storage operations

As the cost of owning and operating a natural gas pipeline system is nearly a constant, whether all or only a part of its capacity is utilized, the cost of transporting gas on a unit volume basis is almost inversely proportional to the load factor. It has been shown that large volumes of interruptible industrial sales, up to 60% of the annual sales required for 100% load factor, may be impossible. The gas industry has, therefore, in an effort to obtain high load factor operation without interruptible sales, developed various schemes of storage facilities located at or near the market areas.

A listing of various storage schemes with a generalized unit cost figure for investment per Mcf is as follows:

Underground in depleted gas formations or water bearing sands	$0.40
Underground in excavated caverns	$0.50
Liquefaction	$20
High pressure bottles	$50
Gas holders and spheres	$175—$250

Only underground storage is sufficiently low in cost to permit economic terminal storage in sufficient quantities to level annual load variations. Only the storage in depleted natural gas reservoirs and to a limited extent, in water bearing sands, has been used to date to store such large volumes. The cavern storage method through mining operations theoretically offers promise where natural reservoirs are not available.

There are today in operation, storage fields having a combined capacity in excess of 1,200 MMMcf and economically serving markets as remote as 300 or more miles. Where such storage fields are available, gas may be delivered in to storage during summer months rather than being sold as cheap interruptible fuel. Such a program enables the pipeline to operate at a high load factor, and preserves deliverability to meet peak winter demands of space heating customers, thereby providing the maximum utilization as a superior fuel.

Pipe size-installed horsepower

The basic design factors over which the engineer has control are pipe diameter, maximum operating pressure, pipe wall thickness, compression ratio, and compressor station spacing. For a given diameter and maximum operating pressure, the pipe wall thickness is fixed by the ASA code for pressure piping and is further modified in some states by more stringent codes. Basically, therefore, the design factors are reduced to 4, and the optimum design is obtained by the proper selection of these 4 principal design factors, to the end that the annual cost of owning and operating the pipeline system is maintained at a minimum.

Two basic procedures may be used for arriving at the best selection of the design factors to produce the minimum annual cost of service. One method is essentially "cut and try" through the use of a large

Turn to page 35—**DESIGN FACTORS**

Table 1

Class	No. of customers	Consumption factor	DDD	Annual MMcf	Load factor per cent	Max. day MMcf
Residential general	200,000	25 Mcf	—	5,000	85	16
Commercial general	50,000	75 Mcf	—	3,750	85	12
Residential space heat (A)	80,000	25 cf	7,000	14,000	27	142
Commercial space heat (A)	10,000	75 cf	7,000	5,250	27	53
Small industrial	200	—	—	6,000	70	23
Large industrial	10	—	—	2,000	70	8
Company use and loss	—	—	—	5,400	70	21
		Total		41,400		275

Note: (A) Included in General Customers: $\frac{41,400 \times 100}{365 \times 275} = 41.2\%$

The combined load factor is:

Compressor Inspection Check List

by J. H. Watson
Union Oil Company of California

THIS is an outline of important things to look for when operating a compressor. The list cannot be considered final or infallible. Other things may become important at certain locations. An operator who makes his routine inspection cover the points listed may be sure that he has intelligently checked his equipment. If these points are checked, it is unlikely that he has overlooked much that may develop serious consequences.

1. Is engine running?
If not, why?

2. Is speed (rpm) normal?

A. Underspeed
   1. Deliberately throttled down
   2. Overloaded
   3. Mechanical trouble
   4. Low fuel pressure or high fuel pressure
   5. Ignition
   6. Plugged air intake

B. Overspeed
   1. Load off—temporarily
   2. Governor setting
   3. High fuel pressure
   4. Running away—throttle linkage to governor

3. Are gas intake valves open to compressor cylinders?

A. Compressor temporarily off line
B. Valves throttled to cut load
C. Neglected by previous operator

4. Exhaust manifold temperatures

A. Normal
B. High or low
   1. All cylinders high indicates overload
   2. Some cylinders high, others normal, indicates poor fuel distribution
   3. Some cylinders low and others normal indicates poor ignition if engine is running ragged, or poor fuel distribution.
   4. All cylinders low indicates underload.

5. Oil pressure and temperature

A. Pressure
   1. High oil pressure nearly always due to cold oil.
   2. Low oil pressure—loose bearings, leak in system, high oil temperature.
   3. Fluctuating pressure—low oil level, or chattering of relief valve, plugged pump intake screen.

B. Temperature
   1. Low oil temperature—cold engine; too much cooling.
   2. High oil temperature—cooling system fouled or water off, hot bearing.

6. Jacket water temperature and pressure

A. High temperature usually indicates poor cooling in water cooler—hot day, or low circulation rate; rarely indicates overload on engine.
B. Low temperature indicates engine being overcooled—cold day.
C. High pump pressure—pinched valve in system, fouling in coils.
D. Low pump pressure—system open somewhere and losing water—fouling in pump intake—pump underspeed—by-pass open.
E. Fluctuating—low water, pump losing suction, or engine idling.

7. Are all lubricators working?

A. Don't trust lubricators to be working because plungers are moving. Count the drops. Find out what part of engine each pump serves.
B. Is reservoir full?

8. Crankcase oil level

A. Low. Add oil. Check exhaust stack for smoke—power cylinder rings, leak in cooler, normal usage.
B. High. Has some eager beaver overfilled? Is makeup valve closed tightly? Water leaking into crankcase? Check crankcase drain; if water (more than a few drops) is found, shut machine down.

9a. Fuel injection valves

A. Are all cams moving?
B. Check clearance.
C. Is valve stem following rocker?

9b. Fuel mixing valves

A. Linkage tight, pins secured?
B. Screens clean?
C. Fuel pressures right?

10. Compressor cylinder discharge temperature. (This temperature tells a long story.)

A. Lower than normal—cylinder not pumping gas—intake valve closed.
B. Higher than normal.
   1. Intake valve leaking—or cracked (cylinder valves).
   2. Discharge valve leaking—or cracked (cylinder valves).
   3. Piston rings leaking.
   4. Lubrication stopped—cylinder or piston scored.
   5. Piston rod packing leaking or cut out.
   6. Gas intake valve pinched
   7. High gas intake temperature
   8. Condensate spray being carried over from scrubbers—washes oil off cylinder walls.
   9. Temporary low pressure in system—too many cylinders pulling on low load (Higher ratio of compression).

11. Compressor cylinder valve covers

A. Discharge valve cover plates normally too hot to touch. Watch for burned paint. Hold the back of your hand a few inches away, and if one cover seems hotter than the others, get suspicious.
B. Intake valve covers should be nearly the same temperature as the intake gas. Feel these covers; hot cover indicates valve trouble—cracked, dirty, loose.

12. Scavenging air valves

A. Feel cover plates—hot covers indicate cracked reeds.
B. Intake valve covers should be near atmospheric temperature. Discharge valve covers should be warm but not too hot to touch.

13. Check for leaks—oil, water, gas or air.

Exhaust manifold gaskets, cylinder head gaskets, crankcase cover plates, lubricating oil lines, etc.

14. Listen for unusual noises.

A. You can't do this unless you know the usual or proper sound of the machine.

J. C. REID ELECTED EXEC VP&GM OF SOUTHERN UNION GAS CO.

James C. Reid has been named executive vice president and general manager of Southern Union Gas Co., following the resignation of vice president and operating manager, H. N. Oldham.

James C. Reid

Mr. Reid joined the company in 1935 as assistant operating manager. In 1938 he was elected a vice president and director of one of Southern Union's then subsidiaries, and a director of Southern Union.

From 1943 to 1952 he was director and vice president and operating manager. He was elected executive vice president by the board of directors in 1952.

Gas Industry NEWS

LLOYD LOGSDON RETIRES FROM MUELLER CO.

More than 400 business and financial executives were present at the Ambassador Hotel, Los Angeles, for a testimonial dinner in honor of Lloyd Logsdon, retiring vice president and general manager of Mueller Co. West Coast sales and plant operations in Los Angeles.

Mr. Logsdon, center, is shown above with W. H. Hipsher, left, Mueller Co. executive vice president, and Robert H. Morris, vice president and general sales manager.

Mr. Hipsher led the tribute to Mr. Logsdon for his 35 years of service to the 98-year-old concern.

Executives and officials of the gas and water industries, as well as business associates of the company, attended from 8 states and Hawaii.

George C. Sopp, joint system head and assistant manager, Department of Water and Power, City of Los Angeles, was master of ceremonies.

Mr. Logsdon began as a Mueller Co. sales representative in 1919, later was named sales manager on the West Coast, and then became vice president and general manager of the company's West Coast operations.

Mr. Logsdon's title will be vacated in a reorganization of the plant. Earl E. Bright, factory superintendent since 1952, has been promoted to the position of plant manager, and E. George Baker, administrative assistant to the vice-president and general sales manager at Decatur, has been promoted to assistant sales manager in charge of the Los Angeles sales office.

Robert R. Lugo, Jr., formerly an order interpreter in the sales office of the Los Angeles plant, has been assigned to cover a part of the Los Angeles area and portions of Southern California, and John T. Leahy, assistant to A. O. Yonkers, assistant sales manager in charge of water products at the Decatur office, will travel the Southern Illinois territory.

LOUIS M. MARKS

Louis M. Marks, national sales manager, Timken Silent Automatic Div., Rockwell Spring and Axle Co., died on February 7, at the age of 56.

A veteran of 30 years experience in the sales divisions of heating, radio and appliance firms, Mr. Marks joined Timken in November 1954. Previously, he was sales manager for a heating and air conditioning equipment company in the midwest. During this time, he was an instructor in LP gas and heating equipment extension courses connected with Wichita University and Kansas University.

WILLIAM SCHMIDT, JR.

William Schmidt Jr., chairman, and former president, Consolidated Gas, Electric Light and Power Co., Baltimore, died February 18 in Clearwater, Fla., at the age of 72.

Mr. Schmidt had been associated with the company and Edison Illumination Co., for 56 years. Starting as a clerk in 1898, he became successively secretary, assistant treasurer, treasurer, vice president and executive vice president.

In 1910 Mr. Schmidt was named secretary of the consolidated company and in 1914 he became a director. He was elected president of the company in 1946 and chairman of the board last December.

McELWAIN IS EAST OHIO GAS CO. SM

John S. McElwain, formerly sales manager and personnel director of New York State Natural Gas Corp., has been appointed sales manager of East Ohio Gas Co. With Peoples Natural from 1936 to 1952, Mr. McElwain held various positions, including assistant sales manager and sales promotion manager.

NOT DESIGNED FOR GAS INDUSTRY HARMONY

HOW LONG WILL TEXANS TOLERATE THIS MODERN-DAY "GAS RUSTLING"?

NATURAL GAS IS TEXAS' SECOND MOST IMPORTANT NATURAL RESOURCE. Yet today selfish interests are depleting it at an alarming rate. It is piped 1,500 miles to New England, for example, where it is dumped for industrial use at a price cheaper than Texans are able to buy it for home use.

There is now before the Texas Legislature a bill to conserve this precious natural resource for Texas and its citizens. It is the Economic Waste Bill, known as House Bill 7 (H.B.7), Senate Bill 49 (S.B.49).

This bill would place the production of natural gas under the Texas Railroad Commission, just as oil is now regulated. It would establish a bulwark against Federal control of the gas industry by placing full control in the proved and capable hands of the Commission.

The Economic Waste Bill would deter pipe line companies, operating under monopoly conditions, from arbitrarily fixing the price of gas bought from thousands of farmers and small royalty owners. THIS BILL WOULD PREVENT PRICE FIXING. Texans must insist that supply and demand, operating in a competitive market, plus the sound conservation policies of the Railroad Commission, determine gas prices in the American, democratic way.

Texas home owners should not be required to pay increased prices since almost all of them are already paying more than many out-of-state consumers of Texas gas.

OUR NATURAL RESOURCES WILL NOT LAST FOREVER! TAKE STEPS NOW TO PREVENT ECONOMIC WASTE OF TEXAS NATURAL GAS

Write, Wire or Call Your State Senator and Legislators

Ask Them to Support

HOUSE BILL 7 (H.B.7) and SENATE BILL 49 (S.B.49)

For More Information Write

TEXAS INDEPENDENT PRODUCERS and ROYALTY OWNERS ASSOCIATION

Jack Woodward, Executive

318 Perry-Brooks Bldg., Austin, Texas

Without further comment—than that given in the headline—here is the full content of a 3-column advertisement, reproduced above from an early-February issue of the Dallas *Times-Herald*.

HOW LONG WILL TEXANS TOLERATE THIS MODERN-DAY "GAS RUSTLING"?

Natural Gas is Texas' second most important natural resource. Yet today selfish interests are depleting it at an alarming rate. It is piped 1,500 miles to New England, for example, where it is dumped for industrial use *at a price cheaper than Texans are able to buy it for home use.*

There is now before the Texas Legislature a bill to conserve this precious natural resource for Texas and its citizens. It is the Economic Waste Bill, known as House Bill 7 (H.B.7), Senate Bill 49 (S.B.49).

This bill would place the production of natural gas under the Texas Railroad Commission, just as oil is now regulated. It would establish a bulwark against Federal control of the gas industry by placing full control in the proved and capable hands of the Commission.

The Economic Waste Bill would deter pipe line companies, operating under monopoly conditions, from arbitrarily fixing the price of gas bought from thousands of farmers and small royalty

Is the Protection You Buy TIME-TESTED like TAPECOAT®

...The Quality Coal Tar Coating

There is one dependable yardstick for measuring the quality of protective material: How does it stand up over years of service?

You don't have to experiment when you specify TAPECOAT. It is quality coal tar coating, and coal tar is nature's own defense against corrosion.

Since 1941, when it was introduced as the first protective coating in handy tape form, TAPECOAT has proved its ability to keep vulnerable steel surfaces in "like new" condition year after year. **That's why it is specified by those who know that continuing protection is the first consideration.**

For 13 years, TAPECOAT has provided dependable protection on pipe, pipe joints, tanks, etc., above ground and under ground.

TAPECOAT comes in handy rolls in widths from 2" to 24". It's easy to apply and the coal tar provides both bond and protection at the same time.

Write for brochure and recommendations on your corrosion problem.

The TAPECOAT Company

Originators of
Coal Tar Tape Protection

1529 Lyons Street
Evanston, Illinois

owners. This bill would prevent price fixing. Texans must insist that supply and demand, operating in a competitive market, plus the sound conservation policies of the Railroad Commission, determine gas prices in the American, democratic way.

Texas home owners should not be required to pay increased prices since almost all of them are already paying *more* than many out-of-state consumers of Texas gas.

OUR NATURAL RESOURCES WILL NOT LAST FOREVER! TAKE STEPS NOW TO PREVENT ECONOMIC WASTE OF TEXAS NATURAL GAS

Write, Wire or Call Your State Senator and Legislators
Ask Them to Support

HOUSE BILL 7 (H.B.7)
and
SENATE BILL 49 (S.B.49)

For More Information Write
TEXAS INDEPENDENT PRODUCERS and ROYALTY OWNERS ASSOCIATION
Jack Woodward, *President*
318 Perry-Brooks Bldg., Austin, Texas

ELECT SHONNARD-DAVIS DIRECTORS OF SOUTHERN COUNTIES GAS CO.

Ludlow Shonnard, Jr., and Jay Davis, Jr., were elected directors of Southern Counties Gas Co. recently, following action by the

L. Shonnard, Jr.

Jay Davis, Jr.

company's board of directors. Both men are vice-presidents, Mr. Shonnard, in charge of personnel, claims, and industrial relations activities; and Mr. Davis, in charge of construction and distribution.

Mr. Shonnard joined Southern Counties in 1934. He was appointed personnel manager in 1942, manager of personnel and claims in 1947, and elected vice-president in 1953.

Mr. Davis joined the company in 1938. He was division engineer in the San Gabriel Valley division in 1941; superintendent of the Santa Barbara division in 1942; assistant to the vice-president in 1948; manager of construction and distribution in 1953; and elected vice-president in 1954.

JONES IS NORTH SHORE GAS PRES.

Roy E. Jones has been elected president and a director of North Shore Gas Co. He returned as vice president last September after serving as executive vice president of People's Water and Gas Co. for three years.

AGA INDUSTRIAL-COMMERCIAL SECTION CHAIRMEN NAMED

The chairmen of the industrial and commercial section's committees and subcommittees during the 1955 American Gas Association year are:

MANAGING—Ray Trowbridge, Seattle Gas Co.

METALS—Chester L. Gillum, Dayton Power & Light Co.

Ferrous Metals—C. B. Kiehle, Michigan Consolidated Gas Co.

Non-ferrous Metals—H. Reid Shailer, Jr., Connecticut Light & Power Co.

News and Trends—Arnold D. Spillman, Philadelphia Electric Co.

INDUSTRIAL PROCESSING—E. Gilbert Silven, Providence Gas Co.

Textile and Paper Processing—G. R. Van Kampen, Red-Ray Mfg. Co.

Food Processing—John V. Richards, New Jersey Natural Gas Co.

Glass and Ceramics Processing—Richard L. Lang, Ohio Fuel Gas Co.

Industrial Drying and Finishing Processes Robert A. Modlin, East Ohio Gas Co.

Chemical Processing—Rex T. Ellington, Institute of Gas Technology.

INDUSTRIAL GAS PRACTICES—E. L. Spanagel, Rochester Gas & Electric Corp.

FOOD SERVICE EQUIPMENT—Charles C. Hanthorn, Philadelphia Gas Works div.

Sales Promotion—James J. Condon, Peoples Gas Light & Coke Co.

Appliance Servicing—L. J. Fretwell, Oklahoma Natural Gas Co.

Trends—Hayes S. Walter, AGA.

Counter Appliances—James V. Hall, Northern Indiana Public Service Co.

Water Heating—Joseph N. Betz, Manufacturers Light & Heat Co.

Dealer Cooperation (AGA; GAMA; FSEI, Inc.)—Charles C. Hanthorn (above).

COMMERCIAL PROCESSING—George E. Marble, Michigan Consolidated Gas Co.

Volume Water Heating—Harmon W. Boyes, Union Gas Co. of Canada, Ltd.

Commercial Incineration—George E. Marble (above).

Air Conditioning—George E. Marble (above).

Process Steam—James W. Vance, Peoples Natural Gas Co.

Space Heating—A. E. Eshenfelder, Ohio Fuel Gas Co.

EQUIPMENT IMPROVEMENT—Harry B. Wilson, Brooklyn Union Gas Co.

Equipment Improvement (Joint AGA, GAMA, NRA)—E. V. Fineran, Washington Gas Light Co.

Subcommittee of Joint Committee—E. V. Fineran (above).

SALES TRAINING—W. E. McWilliams, Peoples Natural Gas Co.

DISPLAYS AT NATIONAL EXPOSITIONS—Richard E. Crane, Elizabethtown Consolidated Gas Co.

PROGRAMS AND PAPERS—Walter S. Anderson, Boston Consolidated Gas Co.

NOMINATING COMMITTEE—Charles C. Eeles, Ohio Fuel Gas Co.

PROMOTIONAL-EDUCATIONAL—J. H. Mikula, Milwaukee Gas Light Co.

Industrial Steering—K. I. Robinson, Public Service Electric & Gas Co., N. J.

Commercial Steering—George E. Marble (above).

Repair cost = $\frac{1}{50}$ ¢ per foot on 120,000 feet of extension work

CENTRAL ELECTRIC & GAS CO., Lincoln, Neb. with their Cleveland "Baby Digger" consistently dig an average of about 200 feet of trench per hour . . . a good production average on gas extension projects where numerous line obstacles are encountered both above and below ground.

Their Cleveland, shown above working easily along the edge of a lawn, recently completed more than 600 hours of trench digging—about a half year's work on use of this kind—with no need of repairs or parts replacement due to wear, or maintenance of any kind except normal lubrication and fueling. (One shaft was broken by improper sprocket installation during the regular operator's vacation, at a cost of $28.)

Performance like this—plus compactness and maneuverability, big capacity, and dependability in turning out high daily footage regardless of soil and weather conditions—goes a long way toward explaining why Cleveland "Baby Diggers" have been the gas industry's choice in trenchers for well over 30 years.

Fast moving, too! . . . Cleveland "Baby Diggers" hustle safely from job to job . . . at legal speed limits . . . because they are so easily portable on fast loading Cleveland trailers.

Write for Full Line **CLEVELAND** *Bulletin or see your Local Distributor*

THE CLEVELAND TRENCHER COMPANY • 20100 St. Clair Ave., Cleveland 17, Ohio

CLEVELAND

NEW YORK STATE NATURAL GAS CORP ANNOUNCES 4 PROMOTIONS

New York State Natural Gas Corp. has announced the following recent appointments: Edward C. Inghram has been elected vice president; Robert S. Jefferies has been appointed chief engineer; Eugene R. Seifert is now sales manager; and Donald L. Barger has been appointed superintendent of production and transmission.

Robert S. Jefferies

Edward C. Inghram

Mr. Inghram who has been with the company for more than 23 years will continue his duties as general superintendent. In 1946 he was made assistant superintendent of production and storage for the Peoples Natural Gas Co., a sister company, and in 1952 was elected general superintendent of New York State Natural. In 1953, he was made a director.

Mr. Jefferies joined the company in 1938. He was appointed chief mechanical engineer in 1952.

Mr. Seifert has been with the company for more than 30 years. In addition to his new duties, Mr. Seifert will continue to supervise tax negotiations in New York State and will handle special negotiations involving new property purchases.

Donald L. Barger

Mr. Barger, in his new position will supervise all production, transmission and storage construction operations. He has been with the company for more than 19 years, having started with The Peoples Natural Gas Co., sister company of New York State Natural.

In 1951, Mr. Barger was made assistant superintendent of production and transmission of New York State Natural, with headquarters in Pittsburgh.

ROCKWELL PROMOTES 3 IN PBGH

Three Pittsburgh officials of Rockwell Manufacturing Co. have been promoted to new management posts:

Norman W. Rowand, general manager, Pittsburgh Div., has been named assistant to the vice-president; Paul A. Mankin, chief engineer, Pittsburgh Div., has been named general manager; and Arthur W. Krause, assistant general manager, has been named factory manager.

N. A. Rowand

Arthur W. Krause

Paul A. Mankin

Mr. Rowand, who has headed the Pittsburgh Div. since 1951, will help L. A. Dixon, Jr., vice president, Meter and Valve Div., with special assignments and will head the company's register and drill unit divisions. He joined Rockwell in 1947.

Mr. Mankin, a former vice-president of Bowser, Inc., is nationally known in the field of gasoline and oil measurement and has played a considerable part in the development of the science of electromagnetic metering.

Mr. Krause joined Delta Manufacturing Co. in 1940, before Delta was purchased by Rockwell, he became successively a time study engineer, division industrial engineer and eventually assistant to the general manager of the Bellefontaine, O., power tool plant.

FLAHIVE RETIRES FROM COLUMBIA; STEWART NAMED TO NEW POST

Francis B. Flahive, vice president of Columbia Gas System Service Corp. retired recently, after 28 years of service. He was in charge of insurance, pensions and motor vehicle operations.

Arthur W. Stewart has been named director of transportation, a newly created title since the retirement of Mr. Flahive.

Mr. Flahive joined the company in 1927, was named assistant treasurer of the former Columbia Gas & Electric Corp. in 1928, and was elected vice president in 1941. He was awarded the AGA order of accounting merit in 1952.

Mr. Stewart, who will be in charge of aircraft and motor vehicle operations, formerly was chief pilot for the Columbia Gas System, a position he took in 1952.

VOLKMANN IS KOPPERS RESEARCH MGR; POWELL IS RESEARCH ADVISER

Dr. E. W. Volkmann has been appointed manager, research department, Koppers Company, Inc., and Dr. A. R. Powell has been appointed special research adviser.

Dr. Volkmann joined a predecessor company as chemical engineer in 1926.

From 1923 until 1928, Dr. Powell held the post of research chemical engineer in charge of large-scale research. In 1932 he was named assistant manager of the research department. In 1949 he was named associate manager and last year was appointed acting manager.

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TWO GENERATIONS
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DESIGN FACTORS

Continued from page 29

number of calculations involving the use of various values for the several design factors to determine the best combination. The other method involves the use of calculus to determine the proper combination of design factors, the description of which is beyond the scope of these notes.

An example of the comparison of the use of these basic design factors may be of interest. A pipeline approximately 1,000 miles in length, requiring a deliverability of 300 MMcf per day, may be designed as either a 24″ pipeline operating at 1,000 psig, with compressor stations approximately 80 miles apart, or as a 30″ pipeline operating at 800 psig with compressor stations approximately 240 miles apart, each of which will produce approximately the same cost of service.

There are, however, vast economic differences between these 2 pipe lines. The 24″ line with station spacing of some 80 miles has been powered to approximately its economic optimum, leaving little or no room for expansion in capacity. Its capital cost is less than that of the 30″ line, but its cost of operation is somewhat more.

The 30″ pipeline with a station spacing of some 240 miles, however, may be economically developed by additional compressor stations to a daily capacity of 550 MMcf.

It may now be concluded that, within reasonable limits, the best use of a given size pipeline is with a compressor station spacing of some 80 miles. For a given initial capacity, with any reasonable probability of increased market growth, a larger diameter line with station spacing of 160 to 240 miles may be developed to greater capacity at a lower cost per Mcf of gas transported by the subsequent addition of intermediate compressor stations.

The much needed revision of Section 8 of the ASA Code B31.1 for pressure piping will govern the physical design of pipeline systems. The revised code provides for 4 construction types, each having its specific design factor ranging from 0.72 to 0.40 as applied to the specific minimum yield strength of the pipe. In addition, there are prescribed 4 "class locations" as related to exposure and population indices. Each of the 4 class locations is related to its respective construction type.

KAYSER

Continued from page 19

"In our free competitive economy, there is only one way the consumer can obtain a commodity and that is by paying an adequate price at the point of production. There is not now in our Federal government the power in peace time to order anyone to produce anything. . . . In a free economy, the only way to obtain an adequate supply of any commodity is to pay an adequate price.

Prices already effectively regulated

"But, aside from all other considerations, the Federal regulation of the price in the field is unnecessary because approximately 90% of the price of gas to the consumer is already effectively regulated by the Federal government and the various States.

"Statistics show that the field price of gas constitutes on the average about 10% of the price to the consumer at the burner tip. The interstate pipeline from the field to the city gate connection with the distributor is thoroughly regulated by the Federal Power Commission and has been so regulated since passage of the Natural Gas Act in 1938. The distribution of gas has, since its inception, been regulated by the states and various cities in which such distribution is made.

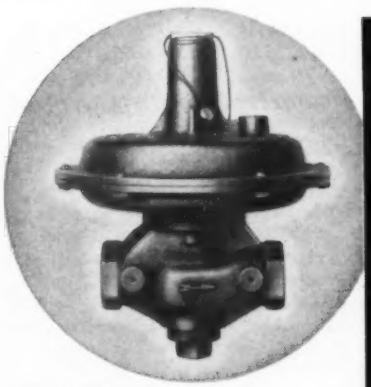
"Both of these operations are recognized utility operations and properly subject to governmental regulation as a public utility. Their earnings can accurately be calculated on a given rate of return and there is a free flow of capital into such enterprises abundantly sufficient for their needs.

"But the exploration for and production of gas is an entirely different kind of business," Mr. Kayser emphasized. "It is highly competitive and extremely risky and will not be undertaken by anyone to any substantial extent for a fixed utility return such as 6% or 6½%.

"There are more than 5,000 different gas producers in the Nation competing with one another to supply the various pipelines."

Steady

REYNOLDS LOW PRESSURE REGULATORS



PIPE SIZES:
¼″ to 8″
¼″ to 3″ with screw connections
3″ to 8″ with flange connections

REPRESENTATIVES:
H. D. "Mike" Meuffels
423 Dwight Building
Kansas City, Missouri
Seidenglanz & Co.
2nd Unit, Santa Fe Building
Dallas, Texas
Eastern Appliance Company
281 Vassar Street
Cambridge, Massachusetts
Waldo S. Hull
258 Lee Circle
Bryn Mawr, Pennsylvania

Reynolds Low Pressure Regulators guarantee steady, constant, unvarying outlet pressure even though the volume varies and inlet pressure fluctuates. Precision built and delicately balanced for accurate performance on low pressure installations, the units illustrated are backed by factory tests over a wide range of operating conditions. Reynolds Low Pressure Regulators are economical and safe. Our Engineering Department is at your service.

GAS CONTROL Since 1892

Reynolds Gas Regulator Co.
ANDERSON, INDIANA, U. S. A.
GAS CONTROL SINCE 1892

SOUTHERN COUNTIES METERS UP

A new record for number of meters added in one year in its system was set in 1954 by Southern Counties Gas Co. By adding 39,097 new meters in its eight operating divisions during the year, the utility topped the prior high mark of 35,471 new meters of 1953 and brought to 497,783 the total number of meters it serves.

Company-wide percentage of meters added during the year was 8.52 over the 458,686 meters the company served as of December 31, 1953.

Since number of meters reflects general development of an area, the fastest growing territories served by the company are Orange County and the Pomona area.

The utility has indicated it expects to add 53,000 new meters throughout its system in 1955.

C. C. WHITTELSEY AND W. B. POOR ADVANCED BY FORD, BACON & DAVIS

Ford, Bacon & Davis, Inc., announce that Charles C. Whittelsey has been advanced to executive vice president, formerly having been vice president in charge of the firm's construction activities. He also will continue as executive vice president of the subsidiary, Ford, Bacon & Davis Construction Corp.

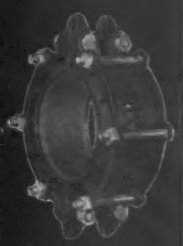
William B. Poor becomes vice president and manager of the construction department. He also has been elected a director of the firm, as well as of the construction corporation.

FOR REPAIRING BELL AND SPIGOT JOINT LEAKS...

SKINNER-SEAL Bell Joint Clamp for stopping bell and spigot joint leaks under pressure. Gasket is completely sealed; at bell face by Monel Metal Seal band — at spigot by hard vulcanized gasket tip. 2" to 42".

AND BROKEN MAINS

SKINNER-SEAL Split Coupling Clamp. One man can install in 5 to 15 minutes. Gasket sealed by Monel band. Tested to 800 lbs. line pressure. A lasting repair. 2" to 24" incl.



M. B. SKINNER CO.
SOUTH BEND 21, INDIANA, U.S.A.

EQUITABLE GAS COMPANY TO SPEND $9-MILLION IN 1955

Equitable Gas Co. plans to spend over $9 million in 1955 for improvement and expansion of its system in Pennsylvania, West Virginia and Kentucky. In announcing the company's 1955 program, A. W. Conover, president, states that the $9 million provides $2,700,000 for production system improvements; $901,000 for gas storage projects; $680,000 for expansion of transmission facilities, and $3,087,000 for improvement and extension of the distribution system. $1,300,000 has been appropriated for construction of a 12" diameter pipeline to carry natural gas to Equitable's newly formed subsidiary, Kentucky Hydrocarbon Co. Kentucky Hydrocarbon will eventually produce approximately 10 MMcf per day of ethane, propane, butane and natural gasoline, using raw natural gas as a source material.

The largest proportionate share of the budget is allocated for distribution projects, which include installation of new street mains, district regulators and similar facilities to maintain adequate service on the consumer level. Of the $3,087,000 for distribution improvements, $2,992,741 will be spent within the company's Pennsylvania Division.

The budget breakdown by states is: $4,426,000 for Pennsylvania; $759,000 for West Virginia; $3,990,000 for projects in Kentucky, the company's principal gas producing area.

Equitable has also increased its purchases of southwest gas under purchase contracts now in effect with Tennessee Gas Transmission Co. The additional supply amounts to 10 MMcf of gas daily and augments 45 MMcf plus 5 million interruptible received daily by Equitable under its standing contract with Tennessee Transmission. Combined purchases from Tennessee Transmission and Texas Eastern Transmission Corp. give the company 103 MMcf of southwest gas daily. System production in Pennsylvania, West Virginia and Kentucky, plus purchases from independent producers in the Appalachian area, provides approximately 105 MMcf daily. Natural gas from all supply sources adds up to a daily total of 208 MMcf, of which slightly less than 50% is purchased from long-distance suppliers.

FISHER GOVERNOR HAS CANADA PLANT

Fisher Governor Co., manufacturers of automatic pressure and liquid level control equipment, has purchased a factory building in Woodstock, Ontario, Can., and will start manufacturing operations there in the near future. The plant is a modern one-story building and diaphragm motor valves, liquid level controllers and gas regulators will be manufactured there.

William J. Bestmann, who has been in charge of production scheduling in Marshalltown, is moving to Woodstock as general manager of the Canadian plant.

FIELDEN APPOINTS 2 REPRESENTATIVES

New manufacturer's representatives have been named by Fielden Instrument Div. of Robertshaw-Fulton Controls Co. for the Indianapolis and Boston area: Electro Products, Inc. is now the representative in Indianapolis, and in the Boston area, Broger Instrument Sales Co., Inc. will serve as manufacturer's representative.

WESLEY COOK IS PORTLAND G&C VP

Wesley A. Cook was elected vice president, Portland Gas & Coke Co., at a recent meeting of the board of directors. Mr. Cook joined the company in 1946 as rate supervisor and in 1949 also assumed the duties of assistant to the president, which position he has held since that time.

AGA ISSUES 1954 PIPING STANDARD

A 1954 second edition of American Standard installation of gas piping and gas appliances in buildings, Z21.30, has been published by the American Gas Association Laboratories. Publication as an American Standard followed approval by American Standards Association, Inc., on November 29, 1954.

The standard, published in pocket size, forms a valuable guide which incorporates the latest piping and installation practices proven to be acceptable by experience in the field. Sections of the standard contain general provisions for gas piping and appliance installation, requirements covering installation of specific types of gas equipment, and the venting of gas appliances.

Copies may be obtained from the AGA Laboratories, 1032 E. 62nd St., Cleveland 3, or from AGA headquarters, for $0.25 each.

GAS STANDBY

Packaged 12 mcfh plant designed and built by Draketown for...

★ Utility or Industrial standby
★ Peak shaving and augmentation
★ 100% Town or plant supply

A Packaged Draketown Propane Plant will help you reduce demand charges; provide a supply of gas during curtailment periods... at the turn of a valve... or supply that outlying section or plant 100% if desired.

DRAKETOWN® PROPANE PLANTS
"Good Gas Insurance"

If you have a gas problem, we can help you. We operate from coast to coast and overseas.
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Then—it won't *lapse!*

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Designed for maximum control of the reamer. Earth along the pilot bits acts as a bearing to steady the reamer assuring an accurate hole.

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spotlight on trouble

Most of you can tell at a glance what's wrong with this installation. Yet how many times have **insufficient** vent connector rise . . . improper combined vents . . . and **inadequate** single-wall pipe been the rule rather than the exception. And the property damage, unhealthy conditions and costly vent repairs that often result, **reflect unfavorably on the whole gas industry.**

Crusade for Correct Venting

Spotlighting such trouble zones is a current Metalbestos promotion project — part of a continuing campaign to rectify vent installation habits harmful to the gas heating business. It hammers home the demonstrated fact, based on extensive research by William Wallace Company and on generally accepted principles, that **double-wall insulated gas vent pipe is absolutely basic to proper venting procedure.**

Only when this fact is established with all those concerned with gas heating and venting, can the gas industry expect complete acceptance for the products and services they have to sell.

Free copies of informative literature for use by dealers, contractors, architects, builders and home owners are available on request.

write to Dept. AA-2109

METALBESTOS DIVISION

WILLIAM WALLACE COMPANY • BELMONT, CALIF.

MEN at Work

J. C. ABRAM was named division sales supervisor, San Fernando Valley, *Southern California Gas Co.*

GEORGE A. ABSHER is now supply superintendent, special services dept., *Southern California Gas Co.*

ROLAND W. BARTLETT has been promoted to manager, Detroit district, *Worthington Corp.*

W. LEON BEASLEY was promoted to manager, Sapulpa area, *Oklahoma Natural Gas Co.*

HUNTLY BRIGGS has been appointed assistant manager, advertising-sales promotion, *General Controls Co.*

CHARLES W. BROWN is now assistant superintendent, measurement-research, *Texas Gas Transmission Corp.*

GARLAND B. CHILDERS was made general construction superintendent, Industrial Products Div., *Johns-Manville Corp.*

GEORGE W. COULTER has been appointed sales manager, *Manufacturers Light and Heat Co.*

L. E. DERRICK has been appointed manager, Northern Div., *Southern California Gas Co.*

C. T. DIERKER has been promoted to division sales supervisor, central div., *Southern California Gas Co.*

GORDON G. DYE has been named assistant manager, distribution, *Southern California Gas Co.*

JOHN W. FLYNN has been appointed sales supervisor, *Scaife Co.*

LESTER E. GREEN has been appointed manager, customs dept., *Southern California Gas Co.*

E. F. HAWKESWORTH has been named manager, Southwest Div., *Southern California Gas Co.*

O. M. HEARTSILL, JR., is now commercial sales engineer, general sales dept., Tulsa, *Oklahoma Natural Gas Co.*

WILLIAM HOOD has been named acting director, engineering, Unitary Equipment Div., *Carrier Corp.*

W. H. JONES was named manager, purchasing-servicing, *Philadelphia Electric Co.*

RAYMOND S. KRAMER is now chief clerk, measurement-research, *Texas Gas Transmission Corp.*

HOWARD MEHR has joined the public relations dept., *Selas Corporation of America.*

LOREN T. MOORE has been appointed manager, Bristow, *Oklahoma Natural Gas Co.*

M. K. NAUMAN is now administrative aid, sales general office, *Southern California Gas Co.*

R. F. OGBORN has been named manager, customer service, *Southern California Gas Co.*

C. R. RIKEL is now staff supervisor, new construction sales, *Southern California Gas Co.*

E. L. SEELAND is now superintendent of design, *Ebasco Services Inc.*

LEONARD J. SHOREK is now engineer and district representative, Detroit area, *Hauck Manufacturing Co.*

J. N. SHRADER has been appointed manager, division coordination, *Southern California Gas Co.*

CHARLES M. STONE is now assistant chief engineer, *Colorado Interstate Gas Co.*

W. C. STRATTON was made assistant engineering manager, *Ebasco Services Inc.*

C. S. THOMPSON was appointed director of office management, Colorado Springs, *Colorado Interstate Gas Co.*

W. K. WALTERS was promoted to regional manager, Houston, *General Controls Co.*

PHILIP B. WHISNANT has been named salesman, North-South Carolina area, *Scaife Co.*

FRED K. WHITESIDE was made sales-engineering representative, *Selas Corporation of America.*

JAMES W. WILLIAM is now assistant district superintendent, Oklahoma City, *Oklahoma Natural Gas Co.*

W. A. WILSON has been named general staff supervisor, *Southern California Gas Co.*

DAVID R. WOOD was made supervisor, special services, Central Div., *Southern California Gas Co.*

FOX IN NEW M-H AD POST

Eldon E. Fox has been promoted to the newly-created position of director of advertising and sales promotion for Minneapolis-Honeywell Regulator Co. Mr. Fox formerly was advertising manager. Before joining Honeywell in 1950, he spent six years with Young & Rubicam, New York advertising agency.

MAIN TREATMENT SERVICE

"FOGALL H" – Hot Fogging
"FOGALL C" – Cold Fogging
"WETALL" – Dust Laying
"FLUSHALL" – Dust Removal
"SEALALL" – Joint Sealing
"SOLVALL" – Liquid Phase Gum
"RUBBER CONDITIONER" – Rejuvenating Rubber Gaskets
"IRON HYDROXIDE" – Purification

GPM PRODUCTS

GAS PURIFYING MATERIALS CO.
3-15 26th Ave.,
Long Island City, N. Y.

PARKER

Continued from page 28

testimony showed that a purchaser, named Elias, signed a contract for the installation of a heating system. The installation was made but it was unsatisfactory. In response to complaints by Elias, the seller attempted to improve the operation of the system. Finally, Elias decided that the plant would not heat his premises adequately and notified the seller of his rescission of the contract. He asked the seller to remove the system from the premises. The seller refused to accept the offered return of the heating equipment, or to repay the contract price.

The seller attempted to avoid liability on the argument that the purchaser's delay of 3 months in rescinding the contract was unreasonable and forfeited his legal right to rescind the contract. The higher court refused to agree with this argument and in holding the seller liable, said:

"Plaintiff (Elias) did not know of the breach of warranty when the heating plant was installed. When he complained to defendant (seller) he stated that it could be adjusted to heat the building. Elias decided to rescind the sale and notified defendant (seller) of that election within a reasonable time. Diligence in rescission is a relative question, and whether or not there has been an unreasonable delay depends upon the particular circumstances of that case. Use of the heating equipment for a temporary period was necessary in order for plaintiff (Elias) to determine its adequacy. Delay in the decision to rescind, induced by the promise of the seller to make the equipment comply with the warranty, cannot result in a waiver of the right to rescind."

The higher court, in addition to rescinding the contract, awarded Elias the purchase price of the equipment, with interest; the cost of repairing the walls and floors of the building, where ducts were placed by the seller; and rental for storing the equipment until it was removed from the premises by the seller.

Recently, a court held that a clause in a lease contract may protect the gas company, which leases property, from liability for injuries to tenants.

In Jackson v. Lake Forest, 108 N. E. (2d) 36, a company which owned a business building had tenants sign lease contracts which contained a clause that the company should not be liable for damage occasioned by failure of the tenants to keep the premises in good repair.

The court held the company not liable for a tenant's injury who fell down an outside stairway because of defective railing.

For comparison see Hartford Company v. Chicago, 175 U. S. 91. In this case it was shown that a company had a clause in lease contracts, as follows: "Lessor (company) shall not be liable to lessee (tenant) for any damage or injury to him or his property occasioned by the failure of the lessor to keep said premises in repair, and shall not be liable for any damage or injury, arising from any act, omission or negligence of cotenants or of other persons. . . ."

The court upheld validity of clause.

FEDERAL Power Commission

Commission Makes Organizational Shifts; Create One Bureau and Three Offices

The Commission has announced several changes in its organization, including the abolishment of two major bureaus, to be replaced by one new bureau and two offices. In addition, one new office was created. The action abolishes the bureau of accounts, finance and rates, and replaces it with a bureau of rates and gas certificates and a new office of the chief accountant. FPC also abolished its bureau of law, and created instead an office of the general counsel. The third action was to create a new office of administration which will be assigned the administrative functions.

The bureau of rates and gas certificates will carry on the previous functions of the division of rates and the division of gas certificates. Carl T. Kallina, former chief of the gas certificates division, has been designated acting chief of the new bureau. Olof W. Nelson, who now heads the section of engineering analysis, will be acting chief of the gas certificates division.

The former division of accounts and division of finance and statistics will be transferred to the new office of the chief accountant. Charles W. Smith, present chief of the bureau of accounts, finance and rates, has been named chief accountant, to head the new office.

The Commission's entire legal staff, under the new organization, will be assigned to the office of the general counsel. Willard W. Gatchell is general counsel of FPC.

The office of administration will operate under the supervision of FPC's director of administration, J. Kay Lindsay.

Coffman Heads FPC Fort Worth Office

The Commission has appointed Edgar S. Coffman as regional engineer of the Fort Worth, Tex., regional office. He succeeds Wilbur F. Fairlamb, who has resigned. Mr. Coffman, who joined FPC in 1933, has been chief of the division of rates since 1945.

Reject Humble Oil Company Application to Sell Gas to Mississippi River Fuel Corp.

The Commission has rejected an application by Humble Oil & Refining Co., requesting a certificate to sell natural gas to Mississippi River Fuel Corp. on the ground that Humble is not a party to the sales contract under which the gas will be sold.

In a letter to Humble, FPC pointed out that the contract for the sale of the gas is actually between Stanolind Oil and Gas Co. and Mississippi River Fuel Corp. Humble owns a working interest in a unit operated by Stanolind, which has authority to market Humble's proportionate part of the gas produced from the unit. The Commission noted that Stanolind has filed an application covering the sale to Mississippi.

The Commission said that its rules provide that if the operator includes in its application the necessary data regarding non operating working interests, the owners of these interests need not file, even though they are parties to the contract of sale. Pointing out that Humble is not a party to the contract of sale to Mississippi, the Commission said that "in the circumstances it is not apparent that Humble has standing to file the instant application."

Cut in Tex.-Ill. Rate Increase Affirmed

The Commission has affirmed and adopted decision by chief presiding examiner disallowing approximately half of a $5,857,591 annual wholesale natural gas rate increase by Texas Illinois Natural Gas Pipeline Co. The initial decision was issued November 10. The only exceptions were filed by City of Chicago, and these were denied by Commission.

The decision directs Texas Illinois to file new rates within 30 days reducing the total annual amount of its increase by $2,941,-107. The company filed its proposed increase in June 1953; it was suspended by FPC the following month. Since the proceeding had not been concluded at the end of 5-month suspension period provided by Natural Gas Act, the increase went into effect on January 1, subject to refund.

Texas Illinois is required to refund to its wholesale customers the difference between collections subject to refund since January 1, and those allowed by examiner. The refunds, which are to include interest at the rate of 6% per year, must be made within 45 days. Texas Illinois sells natural gas to 15 wholesale customers in Illinois, Indiana, and Missouri.

TETCO and NYS Natural to Expand Storage

Texas Eastern Transmission Corp. and New York State Natural Gas Corp. have been authorized to construct, operate and acquire additional underground natural gas storage facilities as part of their joint Oakford storage project in Pennsylvania.

Under authorization, the companies will construct and operate additional field pipelines to connect wells in the southern portion of Murrysville pool with existing field pipeline system. This will provide for withdrawals from the southern portion and discharge into northern part of the field system.

The companies also plan to acquire a 2,000 hp field compressor station from The Peoples Natural Gas Co. and install additional 1,980 hp at this station. Total estimated cost of all facilities is estimated at $1,160,044.

Rate Increases for Three Columbia System Subsidiaries; Subject to Refund

The Commission has issued orders, making effective as of December 15, suspended wholesale natural gas rate increases, together totaling $3,884,000 annually, by three subsidiaries of The Columbia Gas System, provided the companies file written agreements to refund to their customers any amounts subsequently disallowed.

The increases are in addition to increases aggregating $29,671,000 per year which the companies were permitted to make effective as of November 1, 1954 in a similar manner.

The companies, together with the amounts of their increases, are: United Fuel Gas Co., $2,668,000; Central Kentucky Natural Gas Co., $461,000; and Atlantic Seaboard Corp., $755,000.

Suspend Three Phillips Petroleum Rate Increases; Reject a Conditional Filing

The Commission has suspended two natural gas rate increases, amounting to $577,-696 annually, proposed by Phillips Petroleum Co. for sales to two interstate pipeline companies. The suspended increases affect Michigan-Wisconsin Pipeline Co., $353,770 per year, and Northern Natural Gas Co., $223,926 annually. Phillips had proposed to make both increases effective as of January 1.

Two Exempt Under Hinshaw Amendment

The Commission has issued orders exempting Cincinnati Gas & Electric Co. and Michigan Consolidated Gas Co. from regulation under the Natural Gas Act pursuant to the terms of the Hinshaw Amendment.

Fifty-seven companies have now been exempted, and two others partially exempted, from jurisdiction under Section 1(c) of the Act.

Okay New Facilities for El Paso Natural

The Commission has granted temporary authority to El Paso Natural Gas Co. to construct about 74 miles of natural gas pipeline and 6,925 additional compressor horsepower on its system in Texas, New Mexico, and Arizona.

Total estimated cost of the project is $13,869,017. The new facilities will be used as integral parts of El Paso's Permian Basin-San Juan Basin transmission system.

Two Colorado Companies Increase Rates

The Commission has issued orders making effective, February 1, wholesale natural gas rate increases by two Colorado pipeline companies, provided they file written agreements to refund to their customers any amounts of the increases subsequently disallowed by the FPC. The increases are by Colorado Interstate Gas Co., totaling $10,269,000 per year; and by Colorado-Wyoming Gas Co., amounting to $1,147,-000 annually. Colorado-Wyoming's increase is based largely on the proposed higher rates of Colorado Interstate, its supplier.

Colorado Interstate's increase was suspended last August and Colorado-Wyoming's in September.

Allow $5,900,000 of Natural of America Proposed $7,200,000 Rate Increase

A presiding examiner has filed a decision, subject to review by the Commission, allowing part of a wholesale natural gas rate increase proposed by Natural Gas Pipeline Co. of America.

Natural was seeking a total increase of about $7,200,000 annually. The decision allows outright approximately $5,900,000 of this amount subject to reductions and refunds to reflect any decrease in the rates of two of its suppliers. A considerable portion of the remaining $1,300,000 of Natural's proposed increase was disallowed.

Gas Industry CALENDAR

FEBRUARY

11 NEGA manufacturer-distributor division, Hampshire House, Boston
23-24 PCGA seminar, electronic data processing, Los Angeles.

MARCH

2-3 PCGA home service conference, Santa Monica.
4 SGA transmission management conference, Shamrock Hotel, Houston.
7-9 Mid-West Gas Association, St. Paul Hotel, St. Paul, Minn.
9-10 PGCA customers service conference, Carmel, Calif.
17-18 SGA conferences, Jung Hotel, New Orleans:
accounting management
distribution management
sales executive
21-23 AGA general management section, spring conference, Netherland Plaza, Cincinnati.
23-24 PCGA accident prevention conference, Santa Barbara, Calif.
24-25 NEGA, annual meeting, Hotel Statler, Boston.
24-25 Oklahoma Utilities Association, convention, Mayo Hotel, Tulsa.
28-Apr. 1 Western metals exposition (PCGA exhibit), Los Angeles.

APRIL

5-7 Univ. of Oklahoma—NACE, corrosion control short course, Norman.
12-14 AGA sales conference, industrial and commercial gas, Hotel Statler, Boston.
12-15 AGA distribution, motor vehicles and corrosion conference, Netherland Plaza, Cincinnati.
14 GAMA 6th annual range conference, Hotel Pierre, New York.
18-19 AGA residential section, eastern natural gas sales conference, Hotel Wm. Penn, Pittsburgh.
19-20 PCGA distribution conference, Phoenix, Ariz.
19-21 Southwestern gas measurement short course, Univ. of Oklahoma, Norman.
25-27 Midwest sales conference, Edgewater Beach Hotel, Chicago.
25-27 Electric and gas utility accountants, national conference, Conrad Hilton Hotel, Chicago.
27-29 AGA research and utilization conference, Hotel Statler, Cleveland.

MAY

1-4 LPGA convention, Conrad Hilton Hotel, Chicago.
2-3 PCGA transmission conference, Palm Springs, Calif.
2-6 AGA industrial gas school, Hotel Wm. Penn, Pittsburgh.
9-10 AGA gas supply, transmission, storage conference, Hotel Wm. Penn, Pittsburgh.
9-13 National restaurant exposition (AGA exhibit), Navy Pier, Chicago.
12-13 PUAA, Sheraton Hotel, Chicago.
16-18 SGA 47th annual convention, New Orleans.
17-19 Pennsylvania Gas Association, Pocono Manor, Pa.
23-24 AGA residential section, N.Y.-N.J. sales conference, Hotel Commodore, New York.
23-25 AGA chemical, engineering, manufactured gas production conference, Hotel New Yorker, New York.

JUNE

5-9 Canadian Gas Association, annual meeting, Sheraton-Brock Hotel, Niagara Falls, Ont.
9-10 Natural Gas and Petroleum Association of Canada, Royal Connaught Hotel, Hamilton, Ont.
27-28 Michigan Gas Association, Mackinac Island, Mich.

JULY

18-Aug. 13 Southeastern Gas Association, short course in gas technology, Raleigh, N. C.
18-22 Western summer appliance market, Merchandise Mart, San Francisco.

AUGUST

15-Sept. 10 Southeastern Gas Association, short course in gas technology, Raleigh, N. C.

SEPTEMBER

7-9 Mid-West Gas Association, school and conference, Iowa State College, Ames.
9 New Jersey Gas Association, Hotel Monmouth, Spring Lake.

OCTOBER

12-14 GAMA annual meeting, El Mirador, Palm Springs, Calif.
17-19 AGA-PCGA joint-convention, Los Angeles.
17-21 National metal show (AGA exhibit) Philadelphia.
24-26 Pacific Coast restaurant convention, Biltmore Hotel, Los Angeles.

NOVEMBER

13-18 ASME, Congress and Hilton hotels, Chicago.
14-17 API, San Francisco.

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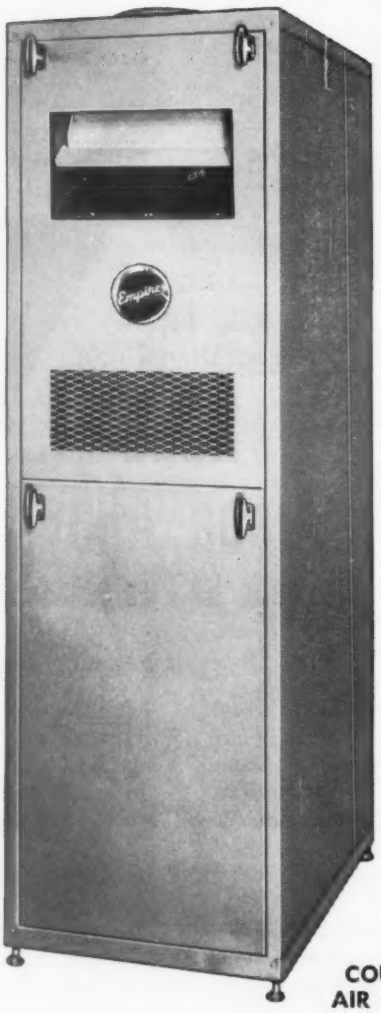
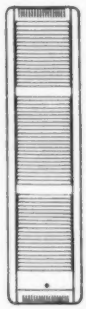
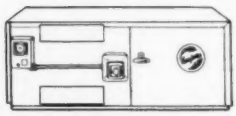


Gas **CIRCULATOR HEATER**



ZONE CONTROL RECESSED HEATER



HORIZONTAL *Gas* **HEATER**

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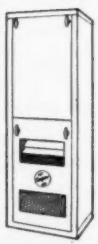

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